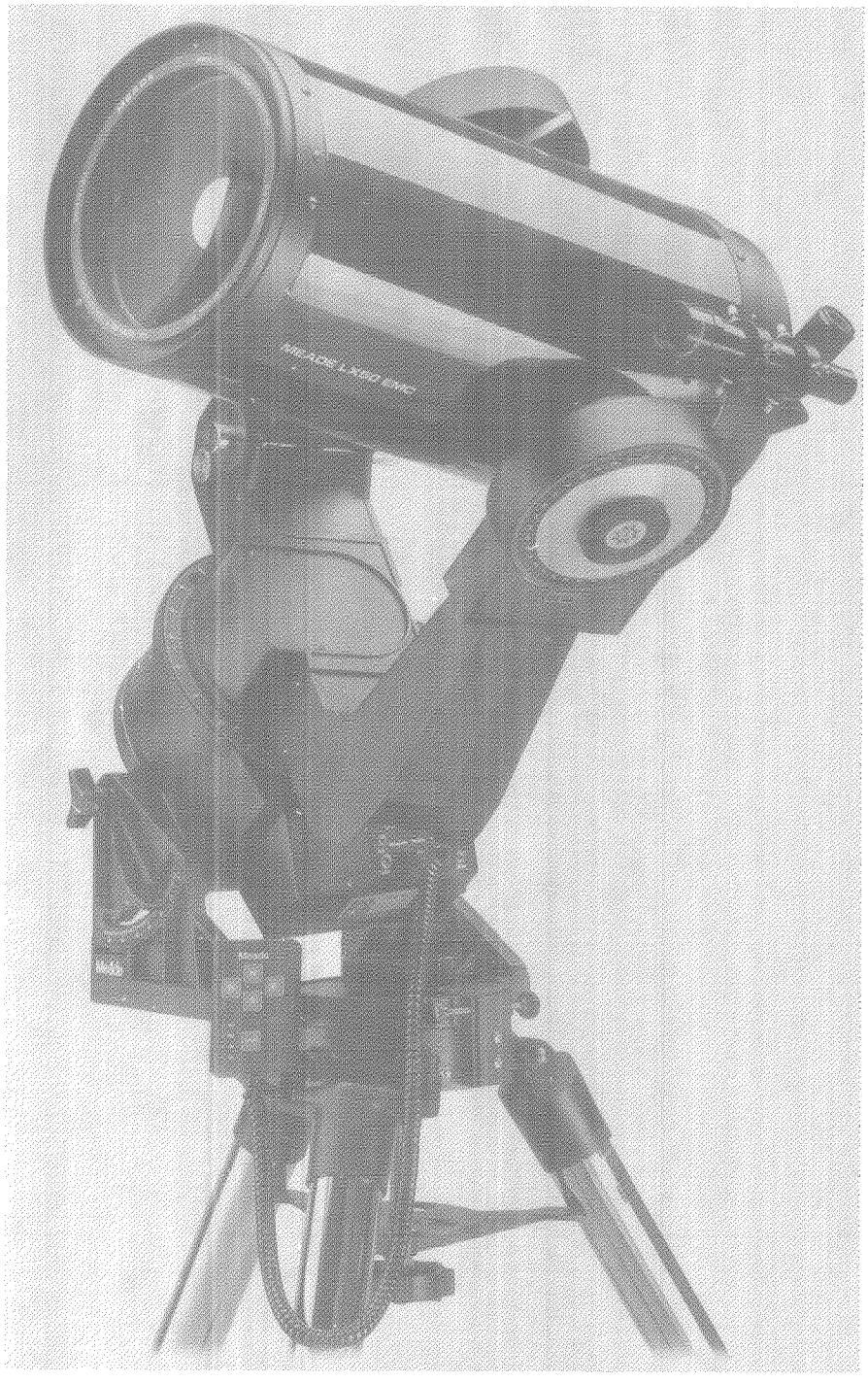
INSTRUCTION MANUAL

7" LX50 Maksutov-Cassegrain Telescope
8" LX50 Schmidt-Cassegrain Telescope
10" LX50 Schmidt-Cassegrain Telescope



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WARNING!

Never use the Meade ETX-Series Astro Telescope to look at the Sun! Looking at or near the Sun will cause *instant* and *irreversible* damage to your eye. Eye damage is often painless, so there is no warning to the observer that damage has occurred until it is too late. Do not point the telescope or its viewfinder at or near the Sun. Do not look through the telescope or its viewfinder as it is moving. Children should always have adult supervision while observing.

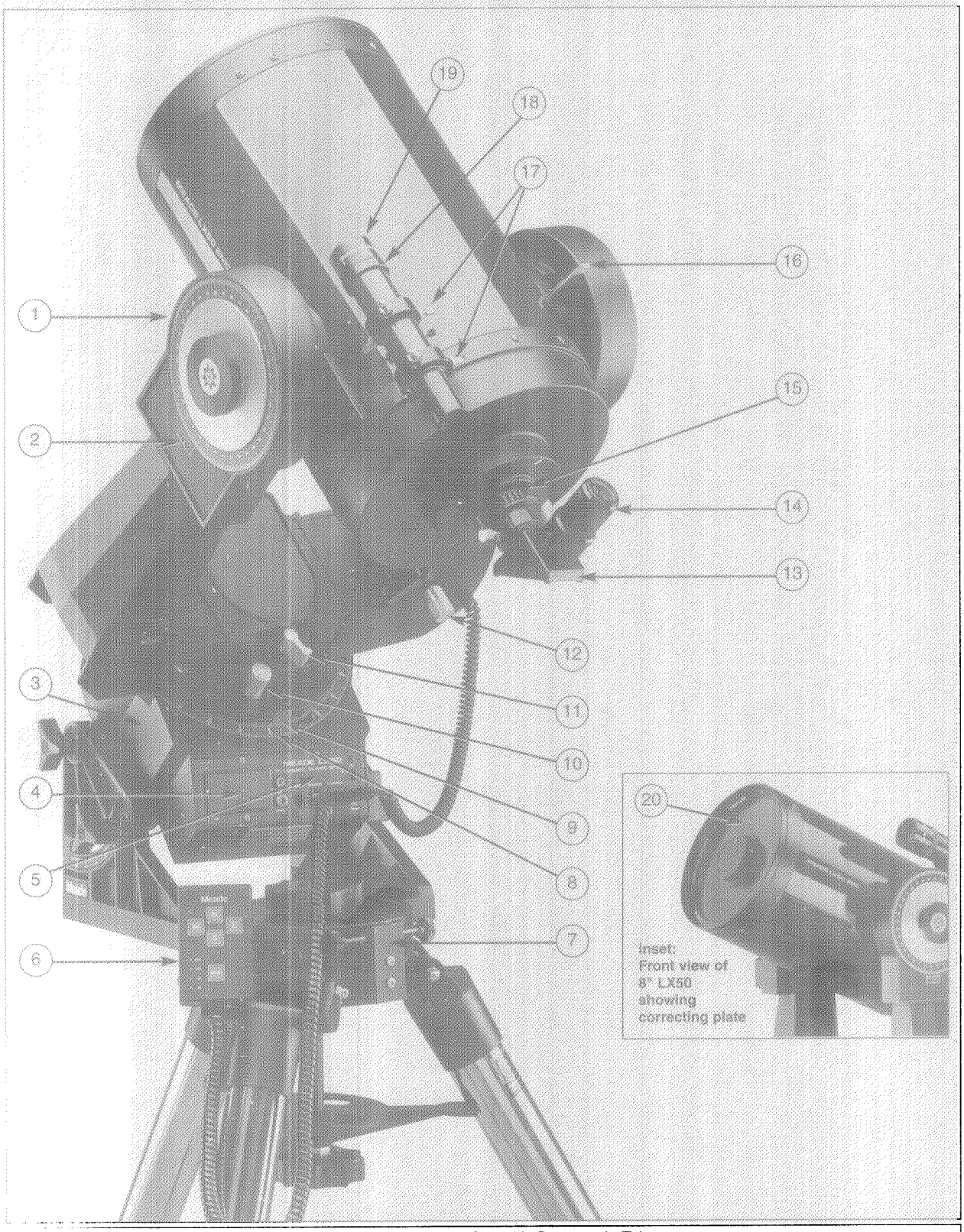

Fig. 1: The Meade 8" LX50 Schmidt-Cassegrain Telescope.

Captions for Fig. 1

1. **Declination (Dec.) Setting Circle**
2. **Declination Pointer**
3. **Drive Base**
4. **Battery Compartment**
5. **Control Panel**
6. **Keypad Hand Controller**
7. **Azimuth Control**
8. **R.A. Setting Circle**
9. **R.A. Vernier Pointer**
10. **R.A. Slow-Motion Control Knob**
11. **R.A. Lock**
12. **Dec. Slow-Motion Control Knob**
13. **Diagonal Prism**
14. **Eyepiece**
15. **Eyepiece Holder**
16. **Dec. Lock**
17. **Viewfinder Collimation Screws**
18. **Viewfinder Focus Lock Ring**
19. **Viewfinder Lens Cell**
20. **Correcting Plate**

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INTRODUCTION

The Meade LX50 model telescope is designed for advanced visual and astrophotographic applications. Serious amateur astronomers will be able to view fault lines, craterlets, and pockmarks on the Moon, prominent features of the Martian landscape; the rings of Saturn and several satellites of Saturn; as well as surface phenomena on the planet Jupiter and the four principal satellites of Jupiter. Beyond the Solar System the LX50 model permits detailed observations of nebulae, star clusters, galaxies, and thousands of other deep-space objects.

For the astrophotographer, this telescope model facilitates long-exposure guided photography with its stable fork mounting, DC electronic worm-gear drive system, and hand controller.

This manual is designed for the Meade 7" LX50 Maksutov-Cassegrain, 8" LX50 Schmidt-Cassegrain, and 10" LX50 Schmidt-Cassegrain Telescopes. With the exception of a few assembly operations and features, 7", 8", and 10" LX50 models are almost identical operationally. Differences in procedures among the three models are noted below. Most standard and optional accessories are interchangeable among the three telescopes. For optimal enjoyment of the Meade LX50 telescope models, please take a few minutes to read this manual thoroughly to become familiar with all of the instrument's astronomical and terrestrial observing capabilities.

PARTS LISTING

While unpacking the telescope, take a moment to note the following parts and assembly materials included with the telescope. Refer to Figs. 1, 2, and 3 to become familiar with the various parts.

- Optical tube assembly and fork mount.
- Equatorial wedge, including:
  - — Wedge body with factory-installed fine latitude adjustment mechanism located adjacent to the latitude scale.
  - — Tilt plate.
  - — 3" manual knob.
  - — 4 buttonhead socket screws (with washers) for attaching tilt plate to wedge body (10" model only).
  - — 3 buttonhead socket screws for mounting the telescope's drive base to the tilt plate (10" model only).
  - — 4 star-shaped lock knobs (with washers) for attaching the tilt plate to the wedge (7" and 8" models only).
  - — 3 star-shaped, lock knobs for mounting the telescope's drive base to the tilt plate (7" and 8" models only).
  - — Azimuth Control (see page 6).

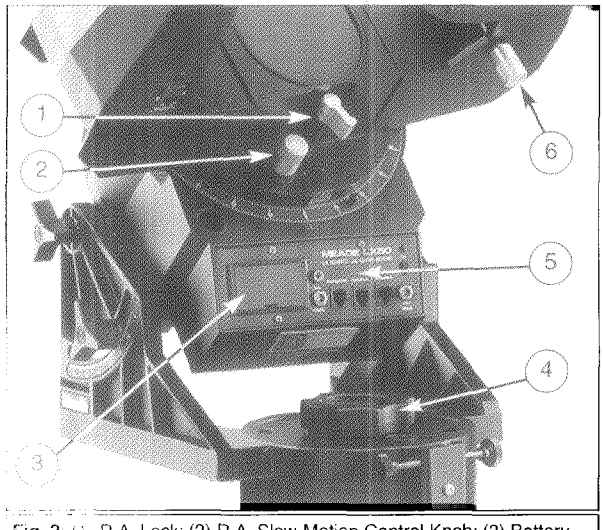


Fig. 2: (1) R.A. Lock; (2) R.A. Slow-Motion Control Knob; (3) Battery Compartment; (4) Manual Knob; (5) Control Panel; (6) Dec Slow-Motion Control Knob.

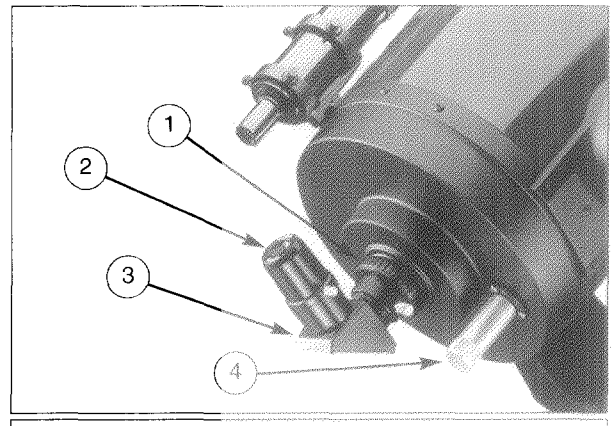


Fig. 3: (1) Eyepiece Holder; (2) Eyepiece; (3) Diagonal Prism. (4) Focus knob.

- Standard Accessories, including:
  - — 25mm eyepiece
  - — Diagonal prism
  - — Eyepiece holder
  - — 25 ft. DC power cord
  - — Coiled cord for declination motor
  - — Keypad hand controller
  - — Hex-wrench set with 4 wrenches
  - — Viewfinder
    - 6 x 30 viewfinder mounted in its bracket with 6 alignment screws (7" and 8" models)
    - 8 x 50 viewfinder and bracket with 6 alignment screws. Bracket and alignment screws packaged separately. (10" model)
  - — 2 ft. coiled cord for fan (7" model only)

NOTE: It is strongly recommended that you keep the original packaging materials. Should it ever be necessary to return your telescope to Meade Instruments for servicing, commercially shipping the telescope in its original packaging materials will best protect the instrument.

CAUTION: (10" LX50 Only)Read this note BEFORE attempting to turn the focus knob (4), Fig. 3, of the optical tube. Locate the red-colored slotted head bolt next to the base of the focuser. This bolt is used for safety in shipment only. Remove this bolt before attempting to turn the focuser knob. In place of this bolt, insert the plastic plug provided as a dust protector (this plastic plug is included with the optical tube assembly). The focuser will now be operational. The 10" LX50 should never be commercially shipped without this red-colored bolt in place. This bolt is essential for commercial transport where rough handling may occur. For personal transport and storage, this bolt is not required.

User Supplied Materials

The following items are required for use of the 7", 8", and 10" LX50 models:

- 6 AA-size batteries (long-life alkaline batteries are best.)
- Field Tripod. The Meade LX50 is supplied without a tripod. If using a tripod other than the optional Meade LX50 Field Tripod, be certain that the tripod is specifically designed to safely and securely carry the weight of the telescope. Do not attempt to use an underweight or undersized tripod with the telescope.

The following discussion assumes that the telescope will be used with the optional LX50 Field Tripod (see **OPTIONAL ACCESSORIES**, page 16).

ASSEMBLY INSTRUCTIONS

1. LX50 Field Tripod

The Field Tripod (Figs. 4 and 5) is virtually completely assembled at the Meade factory; getting the tripod ready for the telescope requires only a few minutes. The required hardware can be found at one end of the tripod shipping box, separated from the tripod by a sheet of cardboard to guard against damage during shipment. Parts included with the LX50 Field Tripod

- Tripod
- Spreader bar
- 6 star-shaped lock knobs

Assembling the Tripod

With the tripod feet down and completely collapsed (Fig. 4), grasp two of the tripod legs and, with the full weight of the tripod on the third leg, *gently* pull the legs apart until they are completely extended.

Thread the 6 lock knobs (2 on each tripod leg) (5, Fig. 5) into the provided holes near the foot of each tripod leg. These lock knobs are used to fix the height of the inner, extendible tripod leg section.

NOTE: Do not over-tighten. Over-tightening the lock knobs may damage the knob threads or the tripod legs. Tighten the lock knobs firmly, but do not force.

Remove the threaded rod (7, Fig. 5) from the tripod head (1, Fig. 5) by removing the small piece of plastic holding the threaded rod in place. Also remove the plastic bag that is stapled to the threaded rod. This bag contains two "C" clip retainers (see Fig. 4).

Slide the Spreader Bar (6, Fig. 5) onto the threaded rod (note the correct orientation as shown in Fig. 5) and position the threaded rod back through the hole in the center of the tripod head. Place a "C" clip retainer into the slot in the threaded rod. This clip holds the threaded rod in place.

Align the 3 arms of the Spreader Bar with the 3 tripod legs and tighten the Tension Knob (2, Fig. 5) until the Spreader Bar is firmly bracing the tripod legs.

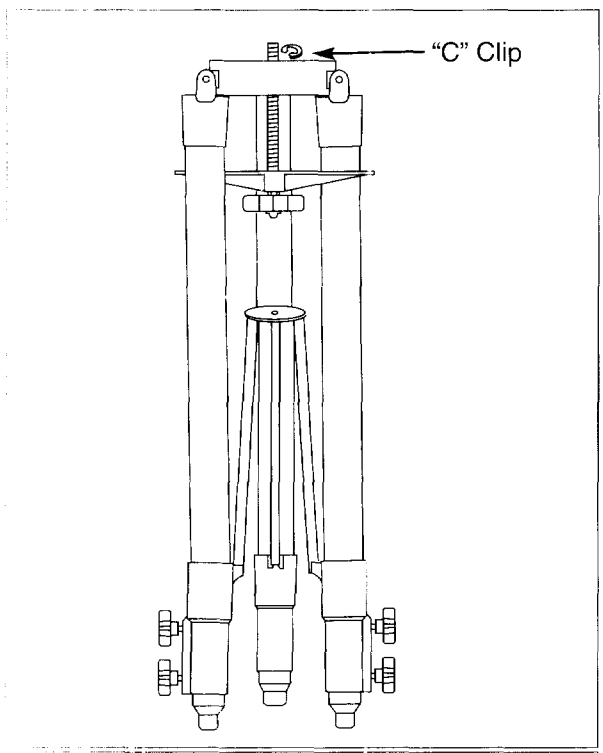


Fig. 4: Field Tripod (collapsed).

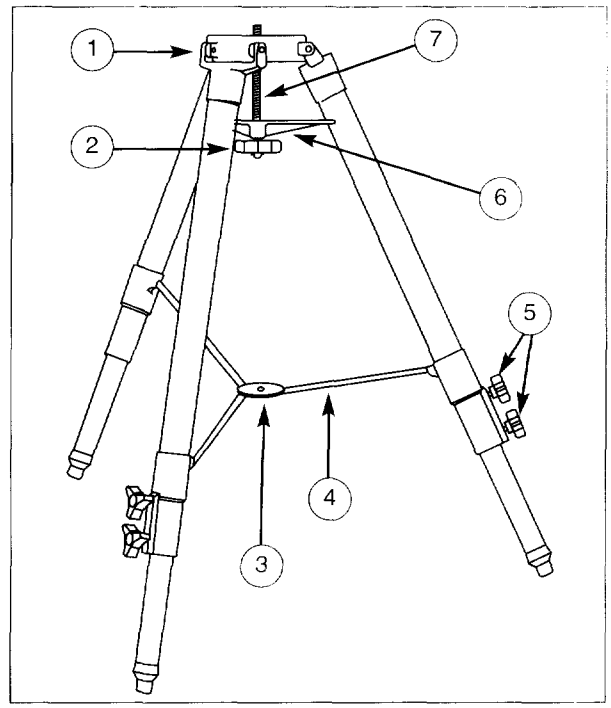


Fig. 5: Field Tripod. (1) Tripod Head; (2) Tension Knob; (3) Tension Hub; (4) Tension vane; (5) Lock Knobs; (6) Spreader Bar; (7) Threaded Rod.

Varying the Tripod Height

Loosen the 6 lock knobs at the base of the tripod legs.

Slide the 3 inner tripod leg sections out to the desired height .

Firmly tighten (but do not overtighten) the 6 lock knobs.

Collapsing the Tripod

Loosen the Tension Knob (2, Fig. 5) until you can rotate the Spreader Bar (6, Fig. 5).

Rotate the Spreader Bar so that each Spreader Bar arm is located between a pair of tripod legs.

Grasp the tripod head (1, Fig. 5) with one hand. With the other hand, pull directly up on the tension hub (3, Fig. 5) of the tension vanes (4, Fig. 5). This action will cause the tripod legs to move inward to a collapsed position.

Important Notes:

1. *If the tripod does not seem to extend or collapse easily, do not force the tripod legs in or out. By following the above instructions, the tripod will function properly. Forcing the tripod into an incorrect position may damage the extension strut system.*
2. *Do not overtighten the 6 lock knobs used to adjust the height of the tripod legs. "Firm feel" tightening is sufficient.*
3. *Be sure the Spreader Bar (6, Fig. 5) is not upside-down on the threaded rod.*

2. Standard Equatorial Wedge

7" and 8" models: The tilt plate (1, Fig 6) attaches to the equatorial wedge body (6, Fig. 6) by means of four star-shaped lock knobs: two of these knobs (with washers) are placed on each side of the wedge body. See (2 and 3, Fig. 6).

Attach the tilt plate to the wedge body by first threading two of the knobs (with washers) through the two holes at the top of the wedge body into the corresponding holes on the tilt plate (2, Fig. 6).

Thread the remaining two lock knobs (with washers) through the curved openings on each side of the wedge body and into the lower-end of the tilt plate (3, Fig. 6).

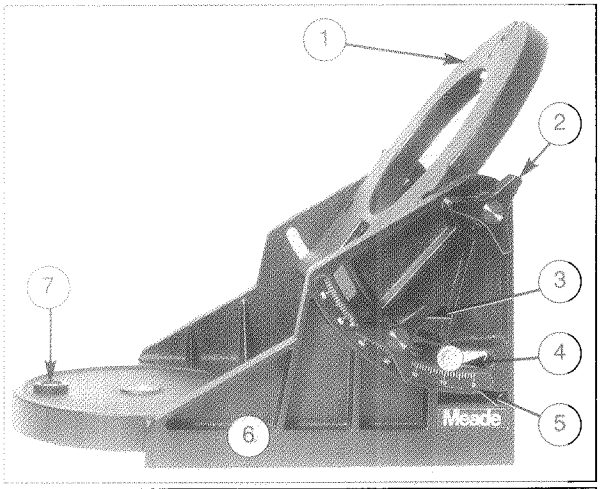


Fig. 6: Equatorial Wedge for 7" and 8" LX50 Telescopes. (1) Tilt-Plate; (2) Attachment Knob; (3) Tilt Angle Locking Knob; (4) Fine Latitude Adjustment Mechanism; (5) Latitude Scale; (6) Wedge Body; (7) Bubble Level.

The latitude scale (5, Fig. 6) appears only on one side of the wedge body. The lock knob on the latitude scale side of the wedge body should be placed in *front* of the fine latitude adjustment mechanism (4, Fig. 6).

Tighten the four lock knobs.

10" model: The tilt plate (1, Fig. 7) attaches to the equatorial wedge body (6, Fig. 7) by means of four buttonhead socket screws; two of these screws (with washers) are placed on each side of the wedge body. See (2 and 3, Fig. 7).

Attach the tilt plate to the wedge body by first threading two of the screws (with washers) through the two holes at the top of the wedge body into the corresponding holes on the tilt plate (2, Fig 7).

Thread the remaining two screws (with washers) through the curved openings on each side of the wedge body and into the lower-end of the tilt plate (3, Fig. 7).

The latitude scale, (5, Fig. 7) appears only on one side of the wedge body. There is a fine latitude adjustment mechanism (4, Fig. 7) on each side of the wedge body; place a buttonhead socket screw in *front* of each fine latitude adjustment screw (3, Fig. 7)

Tighten the four buttonhead socket screws only until firm.

3. Mounting the Equatorial Wedge to the Field Tripod

Place the equatorial wedge on the tripod, slipping the central hole of the wedge body onto the threaded rod sticking up from the tripod head (1, Fig. 5). Thread the 3" manual knob onto the threaded rod and tighten firmly. The equatorial wedge should now be rigidly attached to the LX50 Field Tripod.

10" model: If the telescope is used for astrophotography, a more secure mount may be necessary. Three bolts are included to further secure the wedge body to the tripod. To attach the three bolts, slightly loosen the 3" manual knob. Rotate the equatorial wedge around the threaded rod until the three oval-shaped holes in the floor of the wedge are aligned with three holes in the tripod head. Insert the three bolts and tighten.

NOTE: The Meade Equatorial Wedge is designed solely for use in conjunction with the Meade Field Tripod. The wedge should never be used without the field tripod. If the telescope is placed on the wedge alone, without the field tripod attached to it, the wedge will be seriously overbalanced and the telescope could tip over.

4 Attaching the Azimuth Control

The Azimuth Control for the Meade Equatorial Wedge and Field Tripod is shipped with the Equatorial Wedge. Parts for the

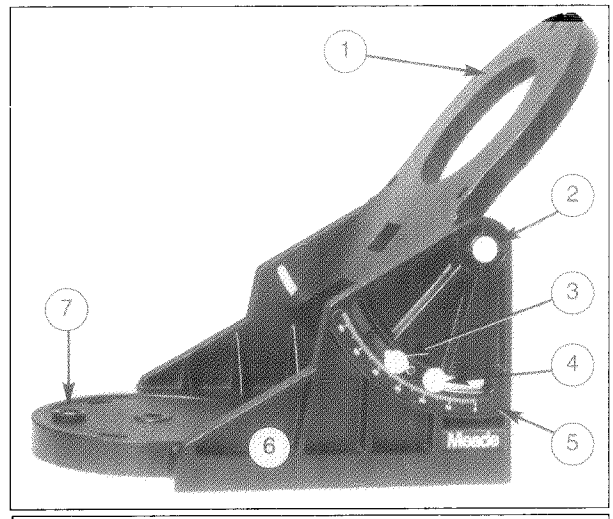


Fig. 7: Equatorial Wedge for 10" LX50 Telescope. (1) Tilt-Plate; (2) Attachment Screw; (3) Tilt Angle Locking Screw; (4) Fine Latitude Adjustment Mechanism; (5) Latitude Scale; (6) Wedge Body; (7) Bubble Level.

Azimuth Control include:

- Azimuth Base (large U-shaped piece of aluminum)
- Azimuth Arm (small T-shaped piece of aluminum)
- 2 pcs. Azimuth Knobs
- 2 pcs. 8-32 x 1/2" flat-head machine screws
- 2 pcs. 8-32 x 1" round-head machine screws

Installing the Azimuth Control (Fig. 8)

With a screwdriver, remove the 4 set screws from the Wedge Body and Tripod Head (2 screws on each) which plug the attachment holes.

Attach the Azimuth Arm (5, Fig. 8) to the Wedge Body using the 2 8-32 x 1/2" flat-head machine screws.

Attach the Azimuth Base (4, Fig. 8) to the Tripod Head using the 2 8-32 x 1" round-head machine screws.

Thread the two Azimuth Adjustment Knobs (3, Fig. 8) into the Azimuth Base, until they touch the Azimuth Arm (5, Fig. 8).

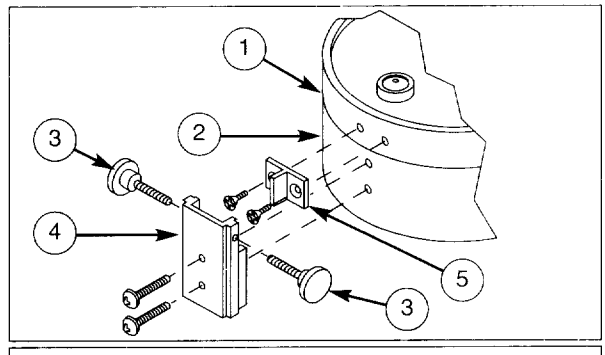


Fig. 8: Azimuth Control. (1) Wedge Body; (2) Tripod Head; (3) Azimuth Adjustment Knobs; (4) Azimuth Base; (5) Azimuth Arm.

Using the Azimuth Control

To make azimuth adjustments, loosen the manual knob (8, Fig. 9). 10" LX50 users will also need to loosen the three extra bolts holding the wedge to the tripod. Rotate the wedge by tightening one of the two azimuth adjustment knobs (3, Fig. 8) while loosening the other. After positioning the wedge, tighten the manual knob (and the 3 bolts if appropriate).

5. Mounting the LX50 on the Equatorial Wedge

With the 7" and 8" models, three star-shaped lock knobs are supplied for mounting the telescope's drive base to the tilt-plate of the equatorial wedge. With the 10" model, three socket screws are provided for this purpose.

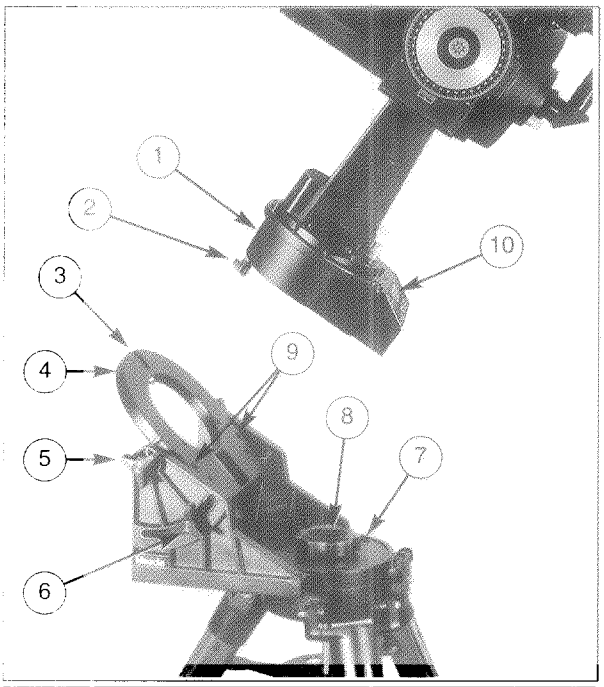


Fig. 9: Mounting the telescope's drive base on the Equatorial Wedge. (1) Drive Base; (2) Knob for Attaching the Telescope to Tilt Plate; (3) Slot for Knob (#2, above); (4) Tilt Plate; (5) Attachment Knob; (6) Tilt Angle Locking Knob; (7) Bubble Level; (8) Manual Knob; 9) Slots for Additional Attachment Knobs; (10) Control Panel.

Thread one of these knobs (or screws, as appropriate) partially into the hole on the underside of the drive base, located at the curved end of the drive base (2, Fig. 9). This knob or screw should be threaded in about 3 full turns, not fully threaded into the hole.

Check that the knobs or bolts at the side of the wedge (3, Fig. 6) or (3, Fig. 7) are firmly tightened before placing the telescope onto the wedge.

Grasping the two fork arms of the telescope firmly, with the Control Panel towards you, place the telescope onto the tilt plate of the wedge by sliding the knob (7" and 8" model) or socket screw (10" model) into the slot at the top of the curved end of the wedge tilt-plate.

Insert the two remaining knobs for the 7" and 8" model, or socket screws for the 10" model, through the underside of the tilt plate and into the underside of the drive base. Tighten down all 3 knobs or screws to a firm feel. Extreme force is not necessary when tightening the knobs or screws.

The telescope is now fully mounted onto the wedge and field tripod. Adjustments in wedge latitude angle and/or azimuth orientation may be made with the telescope in place (see **Polar Alignment**, page 12).

6. Attaching the Eyepiece Holder, Diagonal Mirror, and Eyepiece

Thread the eyepiece holder (1, Fig. 10) directly onto the rear-cell thread.

Slide the diagonal mirror (3, Fig. 10) into the eyepiece holder and lock in place by turning the thumbscrew until tight (firm-feel only).

Slide the provided 25mm eyepiece (2, Fig. 10) into the diagonal prism and lock in place by turning the thumbscrew.

Note: For astronomical observations, the diagonal mirror (3, Fig. 10) generally provides a comfortable right-angle viewing position. Alternately, an eyepiece may be inserted directly into the eyepiece holder for straight-through observations. With the diagonal mirror in place, images will be right-side-up but reversed left-for-right. With the eyepiece inserted directly into the eyepiece holder (straight through), images will be upside-down and reversed left-for-right. For astronomical purposes, the image orientation is of no importance whatsoever. For terrestrial observations, where a fully corrected image is highly desirable, the optical Meade #928 45° Erect-Image Diagonal Mirror should be ordered separately. (See ***OPTIONAL ACCESSORIES****, page 15.)*

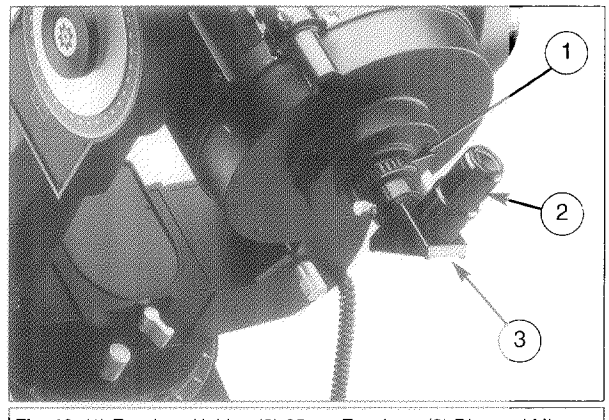


Fig. 10: (1) Eyepiece Holder; (2) 25mm Eyepiece; (3) Diagonal Mirror.

7. Mounting the Viewfinder

To attach the standard-equipment viewfinder, remove the two viewfinder mounting screws from the rear cell of the telescope using the appropriate hex wrench supplied with the telescope. Refer to Fig. 1 to determine the general position of the viewfinder. Place the viewfinder bracket over these mounting holes and replace the two mounting screws. Tighten these screws to a firm-feel only.

10" model: Slide the viewfinder into its bracket with the eyepiece end of the viewfinder fitting first through the *front* of the bracket. It may be necessary to slightly unthread the six alignment screws. With the viewfinder inside the bracket, tighten (*to a firm feel only*) the six alignment screws.

Do not attempt to focus align the viewfinder at this time. Instructions for focusing and alignment of the viewfinder are presented later in this manual.

Once attached, the viewfinder may be left permanently mounted to the telescope.

8. Installing Batteries

Open the battery compartment (3, Fig. 11) located on the control panel and remove the battery carrier.

The battery carrier holds six AA-size batteries. Insert the batteries as indicated on the diagram on the battery slots. Slide the battery pack back into the battery compartment and close the lid.

FIRST OBSERVATIONS

Using both hands, remove the metal dust cover over the correcting plate (20, Fig. 1) by gently pulling it away from the telescope. Be careful not to touch the correcting plate (see **MAINTENANCE AND SERVICING**, page 16). To protect the correcting plate, replace the dust cover whenever the telescope is not in use.

Note on the 7" model: The length of the 7" LX50 optical tube prohibits the correcting plate end of the tube from swinging through the fork arms — the tube would hit the mount. There are mechanical stops to prevent the tube from hitting the mount. Do not force the telescope past these stops or damage to the telescope will occur.

Telescope Controls

An important array of controls facilitates operation of the LX50 model telescope. *It is best to become familiar with all of these controls before attempting observations through the telescope.*

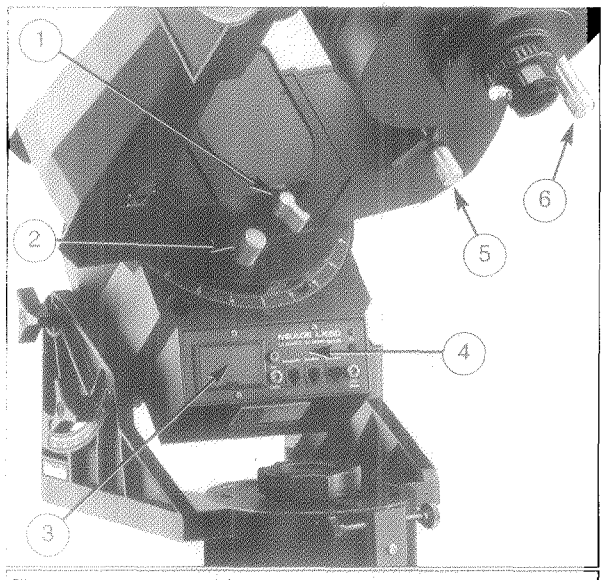


Fig. 11: (1) R.A. Lock; (2) R.A. Slow-Motion Control Knob; (3) Battery Compartment; (4) Control Panel; (5) Dec Slow-Motion Control Knob; (6) Focus Knob.

Focus Knob (6, Fig. 11): Turning this knob causes a finely-controlled internal motion of the telescope's primary mirror to achieve precise focus of the telescopic image. The telescope can be focused on objects from a distance of about 25 feet to infinity.

Dec Lock (1, Fig.12): Locking and unlocking the Dec movement of the optical tube is accomplished by moving the Dec lock lever all the way forward for fully locked, or by moving the Dec lock lever all the way back (towards the eyepiece) for fully unlocked. Remember: never attempt to move the optical tube manually when the Dec lock is locked.

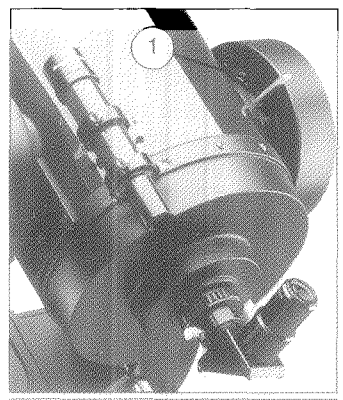


Fig. 12: (1) Declination (Dec) Lock.

Dec Slow-Motion Control (5, Fig. 11): With the Dec lock in the fully locked position (with the lever pushed forward towards the front end of the optical tube), the Dec Slow-Motion Control may be used for fine motions of the telescope in a vertical direction. (The meaning of "Dec," or Declination, is explained below.)

R.A. Lock (1, Fig. 11): Locking and unlocking the R.A. lock is accomplished by moving the R.A. lock lever all the way to the left for fully locked, to the center for partially locked, and all the way to the right for fully unlocked. Remember: never attempt to move the optical tube manually when the R.A. lock is fully locked.

R.A. Slow-Motion Control (2, Fig. 11): With the R.A. lock either fully unlocked or partially locked, the R.A. slow-motion control knob permits manual slow-motion of the telescope in a horizontal direction. (The meaning of "R.A.," or Right Ascension, is explained below.)

Important Notes:

- *Right Ascension (R.A.) Slow-Motion Control (2, Fig. 11) should never be turned when the R.A. lock (1, Fig. 11) is in the fully LOCKED position; damage to the internal gears may otherwise result.*
- *The Declination (Dec) Slow-Motion Control (5, Fig. 11) has a fixed travel length. At some point after turning the Dec Slow Motion Control continuously in the same direction, the control will become difficult to turn. Do not attempt to turn the Dec Slow-Motion Control past this point or damage to the internal mechanism will result. Instead, back-off the Dec Slow-Motion Control by turning the control about 50 turns in the opposite direction. Unlock the Dec lock (1, Fig. 12) and move the telescope manually to center the object; then resume use of the Dec Slow-Motion Control. Never attempt to move the optical tube manually when the Dec lock (1, Fig. 12) is in the LOCKED position.*

After becoming familiar with the telescope's controls, make your first observations of a simple land object - a telephone pole or building, perhaps, several hundred yards in the distance. Keep in mind that the viewfinder has not been aligned, so it will be necessary to sight along the optical tube to "aim" the telescope at the object. With the 25mm eyepiece inserted into the telescope's eyepieces holder, look through the telescope and turn the focus knob (6, Fig. 11) clockwise or counterclockwise until the object is in focus.

NOTE: With the eyepiece inserted directly into the eyepiece holder, without using the diagonal prism, the image through the eyepiece will be inverted. This inverted image is a result of the optical structure of the telescope and is normal for astronomical telescopes. If the diagonal prism is inserted into the telescope first, then the eyepiece, the image will appear right-side-up, but reversed left-for-right.

Once the selected object is in focus, with the R.A. lock UNLOCKED, and the Dec lock (1, Fig. 12) LOCKED, use the R.A. slow-motion control knob (2, Fig. 11) and the Dec. Slow Motion Control (5, Fig. 11) to center the object in the field of view.

7", 8" and 10" LX50 Control Panel

The Control Panel includes connectors for DC power input, the DEC Motor, and the Keypad. There are also connectors designed to accept optional accessories such as a CCD autoguiding camera and the optional Meade Encoders*. An illustration and a description of the LX50 Control Panel features follows:

Aux Connector (1, Fig. 13): Provides DC voltage that is the same currently being supplied to the telescope. The power cord for the 7" LX50 cooling fan attaches here.

NOTE: (7" model) The Maksutov optical tube assembly is equipped with a fan which will assist in the stabilization of the temperature of the optics. To operate the fan, make sure the special power cord (supplied in the accessory box) is plugged into the fan and the LX50 Control Panel plug marked "Aux." The fan will start when the power switch is in the "ON" position. The amount of time required to stabilize the temperature is dependent upon ambient conditions at the observation site and the temperature of the telescope itself.

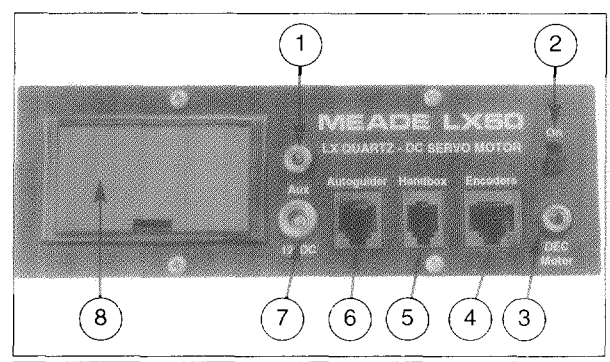


Fig. 13: LX50 Control Panel. (1) Aux Connector; (2) ON/OFF Switch; (3) DEC Motor Connector; (4) Encoders Port; (5) Handbox Port; (6) Autoguider Port; (7) 12vDC Power Connector; (8) Battery Compartment.

The fan should be activated at the beginning of the observation session to accelerate the temperature stabilization. As soon as the optics have reached an equilibrium with the environment, the fan should be turned off by unplugging the fan power cord. Fan operation time should range between 5 and 25 minutes. While it is permissible to run the fan continuously, it is not recommended because the very slight vibration of the fan may cause noticeable movement of the objects observed in the sensitive optics.

ON/ OFF Switch (2, Fig. 13): When moved to the ON position, the power light indicator will blink indicating a self-test in progress. After the self-test is complete (a few seconds) the red light will shine steadily.

DEC Motor Connector (3, Fig. 13): The DEC Motor is a 3mm mini phono jack connector socket, designed to accept standard mini phono jack coil cords. One end of the supplied coil cord plugs into the DEC Motor connector on the Control Panel. The other end of the coil cord plugs into the DEC MOTOR socket in the right fork arm of the telescope to power the declination motor.

Encoders Port (4, Fig. 13): The Encoder Port is designed for use with the optional Magellan II Computer Correction system and is active only after the Magellan II LX50 encoders have been installed on your system. One end of the heavy coil cord (supplied with the Magellan II) plugs into the Control Panel. The other end of the coil cord plugs into the ENCODER port near the base of the left fork arm of the telescope.

Handbox Port (5, Fig. 13): The Handbox Port is a 4-pin phone jack connector socket, designed to accept standard 4-pin phone jack coil cords. Use this port for the LX50 Hand Controller or the optional Magellan II Hand Controller.

Autoguider Port (6, Fig. 13): The Autoguider Port allows direct interfacing with Meade CCD autoguider equipment such as the Pictor 201XT and other popular aftermarket CCD autoguiding/imaging cameras to accomplish autoguiding for non-attended astrophotography. The autoguider effectively watches a star and detects slight movements. When star movements are detected, the autoguider signals drive corrections in the telescope to bring the star to a home position.

Most CCD autoguiding/imaging cameras are supplied with a cable which is compatible with the Autoguider port. If your CCD unit does not have a cable, one can be obtained from the CCD manufacturer.

12vDC Connector (7, Fig. 13): The 12vDC Connector is designed to accept the DC Power Cord for connection to automobile plugs. The acceptable voltage range (under load) is from 5 to 18 volts.

Battery Compartment (8, Fig. 13): The battery compartment accepts six (user supplied) AA-size batteries.

The LX50 Keypad Hand Controller

The LX50 Keypad Hand Controller plugs into the telescope's Control Panel and places precise microslewing capabilities in the hand of the observer. The dual-axis corrector offers four photo-guide or microslew speeds, allowing for the very small tracking corrections necessary for long exposure astrophotography, as well as the ability to microslew to and center on an object. The keypad hand controller is also used to access the special functions of the LX50 model telescope, such as reversing the button directions and selecting different drive rates.

When the LX50 is first powered up, the four LEDs (3, Fig. 14) on the Keypad Hand Controller will light up four times in rapid succession, indicating the telescope is performing its self diagnostic test. The circuits and logic are tested and if any faults are found, the LED's will continue to circulate. If no faults are found, the LED next to 32x will remain illuminated.

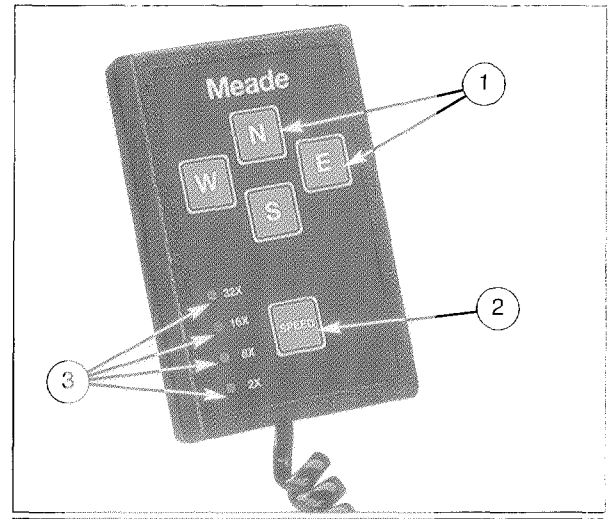


Fig. 14: Keypad Hand Controller. (1) Direction Keys; (2) SPEED Key; (3) LED Indicator Lights.

1. Keypad Hand Controller: Normal Operations

Direction Keys (1, Fig. 14): Four keys, labeled N, S, E, and W on the hand controller are used to move, or slew, the telescope in a specific direction. When pressing a direction key, the only feedback is the motion of the telescope.

Speed Key (2, Fig. 14): The SPEED key is used to adjust the speed at which the telescope moves when pressing one of the direction keys. The current speed will be indicated by one of four LEDs located next to the SPEED key. An illuminated LED indicates the current speed. Pressing the SPEED key will cycle the hand controller through the four speed options. The four speeds are:

32X sidereal rate - useful for centering the object in a viewfinder.

16X sidereal rate - useful for centering the object in a wide-field eyepiece.

8X sidereal rate - useful for centering the object in a high-power eyepiece.

2X sidereal rate - useful for guiding during astrophotography.

NOTE: All of the slew speeds will drive the telescope in all four directions, except for 2X. When pressing the ***E*** *key (for Northern Hemisphere operations) or the* ***W*** *key (for southern Hemisphere operations)* ***with the 2X sidereal speed selected****, you will not hear any movement from the telescope motor, but you will see star movement through the eyepiece. There will be no telescope movement because the 2X sidereal speed stops the Right Ascension tracking motor (when pressing the* ***E*** *key) and allows Earth's natural rotation to make minor adjustments to objects in the telescope's field.*

The tracking speed, or sidereal rate, of the telescope is VERY slow — one complete revolution in 24 hours. An observer cannot SEE the telescope move when it is tracking. There is no noticeable telescope movement when pressing a direction key at the 2X speed unless viewing an object through an eyepiece.

2. Keypad Hand Controller: Special Function Menu

This feature is used to customize the operation of the telescope by changing up to four functions: Northern/Southern Hemisphere Operations; Reversing the N/S Button Direction; Reversing the E/W Button Direction; Changing the Tracking Rate.

To enter the Special Function Menu: Hold down the **E** and **W** buttons for 2 seconds.

To move between features: use the **N** and **S** keys.

To select or change a feature: use the **SPEED** key.

To exit the Special Function Menu: press the **N** key until all four LED's blink in pairs and then press the **SPEED** key. This action will return the telescope to normal operation.

A. Northern/Southern Hemisphere Operation: The 7", 8" and 10" LX50 models are designed to operate from both the Northern and Southern Hemispheres, with the Northern Hemisphere set as the default value. The hemisphere default can be temporarily changed from the Keypad Hand Controller. This change will be in effect as long as power is supplied to the telescope. When the power is turned off, the hemisphere operation reverts back to the Northern Hemisphere setting. To change the hemisphere operation:

1. Use the **N** and **S** key to move to the 32X LED.
2. The LED will blink slowly to indicate Northern Hemisphere operation or rapidly for Southern Hemisphere operation.
3. Pressing the **SPEED** button will toggle between the two hemisphere settings.

B. Reversing the N / S Button Direction: When guiding for an astrophoto, it is often desirable to reverse the direction of the telescope in the North and South movements (*e.g.*, pressing the **N** button, the telescope will move South). To make this change:

1. Use the **N** and **S** key to move to the 16X LED.
2. Press the **SPEED** key. The 16X LED will now blink quickly indicating the buttons have been reversed.
3. Pressing the **SPEED** button will toggle between these two settings.

C. Reversing the E / W Button Direction: When guiding for an astrophoto, it is often desirable to reverse the direction of the telescope in East and West movements (*e.g.*, pressing the **W** button, the telescope will move East). To make this change:

1. Use the **N** and **S** key to move to the 8X LED.
2. Press the **SPEED** key. The 8X LED will now blink quickly indicating the buttons have been reversed.
3. Pressing the **SPEED** button will toggle between these two settings.

D. *Changing the Tracking Rate*: The tracking rate can be changed in .5% increments using this function allowing an observer to accurately track the Moon, comets, asteroids, etc. To change the rate, follow these steps:

1. Use the **N** and **S** key to move to the 2X LED.
2. Pressing the **SPEED** key will activate this mode for input and turn off all four LED's.
3. Press the **N** key for each .5% speed increase (the 32X LED will blink once for each key press) or the **S** key for each .5% speed decrease (the 8X LED will blink once for each key press).
4. When the desired number of speed correction adjustments is entered, press the **SPEED** key to complete the adjustment.
5. When the **SPEED** key is pressed, the 32X or 8X LED will blink once for each .5% adjustment entered, confirming the number of adjustments, and then return to the Special Function Menu, with the 2X LED quickly blinking to indicate the tracking rate has been adjusted.

Tracking the Moon: To set the tracking rate for observing the Moon, decrease the normal rate by 4-6 steps by pressing the **S** key 4-6 times.

NOTE: Whenever tracking speed changes are requested, they are made relative to the standard speed — NOT relative to the last adjusted speed.

E. Exiting the Special Function Menu: To exit the Special Function Menu, press the **N** key until all four LED's blink in pairs and then press the **SPEED** key. This action will return the telescope to normal operation.

LX50 Hand Controller
Special Function Menu Summary

LED	Function	LED Blinking Slow	LED Blinking Fast
32x	Change Northern/Southern Hemisphere	North Hemisphere	South Hemisphere
16x	Reverses N/S Button	N = N S = S	N = S S = N
8x	Reverses E/W Button	E = E W = W	E = W W = E
2x	Change Tracking Rate	Indicates Normal Sidereal Rate	Indicates Adjusted Rate

Magnification

The magnification, or power, at which a telescope is operating is determined by two factors: the *focal length of the eyepiece* employed and the *focal length of the telescope*. Meade LX50 models are supplied with one eyepiece as standard equipment. The focal length of the eyepiece, 25mm, is printed on its side.

Telescope focal length is, roughly speaking, the distance that light travels inside the telescope before reaching a focus. In the mirror-lens design of the LX50 models, however, this focal length is, in effect, compressed by the telescope's secondary mirror, so that long effective telescope focal lengths are housed in a short optical tube.

The focal length of the LX50 7" f/15 telescope = 2670mm.

The focal length of the LX50 8" f/10 telescope = 2000mm.

The focal length of the LX50 10" f/10 telescope = 2500mm.

On a given telescope, different eyepiece focal lengths are used to achieve different magnifications, from low to high. Optional eyepieces and the #140 2x Barlow Lens are available for powers from a range of about 60x to over 500x, depending on the focal length of the telescope and eyepiece (see **OPTIONAL ACCESSORIES**, page 15).

To calculate the magnification obtained with a given eyepiece, use this formula:

$$\textbf{Power} = \frac{\textbf{Telescope Focal Length}}{\textbf{Eyepiece Focal Length}}$$

Example: Using the 25mm eyepiece supplied with the 8" f/10 LX50 telescope, the power is:

$$\textbf{Power} = \frac{\textbf{2000mm}}{\textbf{25mm}} = \textbf{80x}$$

The most common mistake of the beginning observer is to "overpower" the telescope and use high magnifications which the telescope's aperture and typical atmospheric conditions cannot reasonably support. Keep in mind that a smaller, but bright and well-resolved, image is far superior to a larger, but dim and poorly resolved, one. Powers above about 300x should be employed only under the steadiest atmospheric conditions.

Most observers will want to have 3 or 4 eyepieces and perhaps the #140 2x Barlow Lens to achieve the full range of reasonable magnifications (see **OPTIONAL ACCESSORIES**, page 15).

The Viewfinder

The LX50 models, as with almost all astronomical telescopes, present fairly narrow fields of view to the observer. As a result, it is sometimes difficult to locate and center objects in the telescope's field of view.

The viewfinder, by contrast, is a low-power, wide-field sighting scope with crosshairs that enables the easy centering of

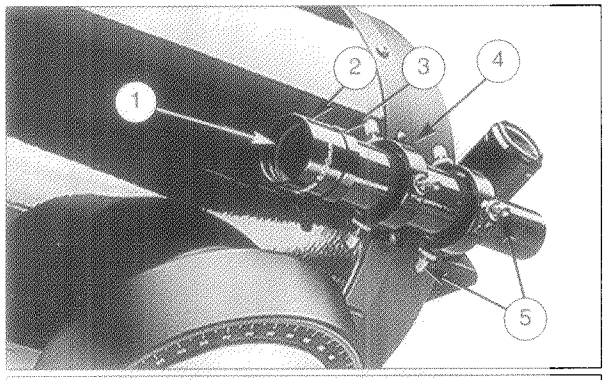


Fig. 15: The Viewfinder. (1) Objective Lens; (2) Lens Cell; (3) Focus Lock Ring; (4) Viewfinder Mounting Bracket; (5) Viewfinder Collimation (alignment) Screws.

objects in the main telescope's field of view. Standard equipment with the 7" and 8" LX50 models is a viewfinder of 6-power and 30mm aperture, called a "6 x 30mm viewfinder." Standard equipment with the 10" LX50 model is a viewfinder of 8-power and 50mm aperture, called an "8 x 50mm viewfinder."

1. Focusing the Viewfinder

The viewfinder has been factory prefocused to objects located at infinity. Individual eye variations, however, may require that the viewfinder be refocused to your eye. Looking through the viewfinder, point the telescope at a distant object; if the viewfinder image is not sufficiently in focus for your eye, it may be refocused as follows:

a. Remove the viewfinder from its mounting bracket (4, Fig. 15) by slightly unthreading the six alignment screws (5, Fig. 15) until the viewfinder can slip out easily.

b. Loosen the viewfinder focus lock ring (3, Fig. 15) at the objective-lens-end of the viewfinder, enabling rotation of the objective lens cell (2, Fig. 15) clockwise or counterclockwise for precise focusing while looking at a distant object through the viewfinder.

c. After a precise focus has been achieved, tighten the viewfinder focus lock ring (3, Fig. 15) against the objective lens cell to lock the focus in place.

d. Replace the viewfinder into its bracket on the main telescope.

NOTE: No focusing is possible from the eyepiece end of the viewfinder.

2. Alignment of the Viewfinder

In order for the viewfinder to be useful, it must first be aligned with the main telescope, so that both the viewfinder and the main telescope are pointing at precisely the same place. To align the viewfinder, follow this procedure:

a. The viewfinder bracket includes six alignment screws (5, Fig. 15) Turn *the three rear-most alignment screws* so that the viewfinder tube is roughly centered within the viewfinder bracket, as viewed from the eyepiece-end of the telescope.

b. Using the standard equipment 25mm eyepiece, point the main telescope at some easy-to-find, well-defined land object, such as the top of a telephone pole. Center the object precisely in the main telescope's field and lock the R.A. Lock and Dec Lock so that the object can not move in the field.

c. While looking through the viewfinder, turn one or more of the three front-most viewfinder alignment screws until the crosshairs of the viewfinder point at precisely the same position as the main telescope.

Confirm that the viewfinder's crosshairs and the main telescope are now pointing at precisely the same object. The viewfinder is now aligned to the main telescope. Unless the alignment screws are disturbed, the viewfinder will remain aligned indefinitely.

3. Using the Viewfinder

Now, to locate any object, terrestrial or astronomical, first center the object on the crosshairs of the viewfinder; the object will then be centered in the field of the main telescope.

NOTE: If higher observing magnifications are desired, first locate, center, and focus the object using a low-power eyepiece (e.g., the 25mm eyepiece). Objects are easier to locate and center at low powers; higher power eyepieces may then be employed by changing eyepieces.

ASTRONOMICAL OBSERVING

The LX50 models offer a wide range of high-performance standard features, making these telescopes excellent observing tools for the serious amateur astronomer. The range of observable astronomical objects is, with minor qualification, limited only by the observer's motivation.

This section provides a basic introduction to the terminology associated with astronomy, and includes instructions for finding, following and photographing celestial objects.

Celestial Coordinates

Celestial objects are mapped according to a coordinate system on the Celestial Sphere (Fig. 16), an imaginary sphere surrounding Earth on which all stars appear to be placed. This celestial object mapping system is analogous to the Earth-based coordinate system of latitude and longitude.

The poles of the celestial coordinate system are defined as those two points where the Earth's rotational axis, if extended to infinity, north and south, intersect the celestial sphere. Thus, the North Celestial Pole (1, Fig. 16) is that point in the sky where an extension of the Earth's axis through the North Pole intersects the celestial sphere. This point in the sky is located near the North Star, Polaris.

In mapping the surface of the Earth, lines of longitude are drawn between the North and South Poles. Similarly, lines of latitude are drawn in an east-west direction, parallel to the Earth's Equator. The Celestial Equator (2, Fig. 16) is a projection of the Earth's Equator onto the celestial sphere.

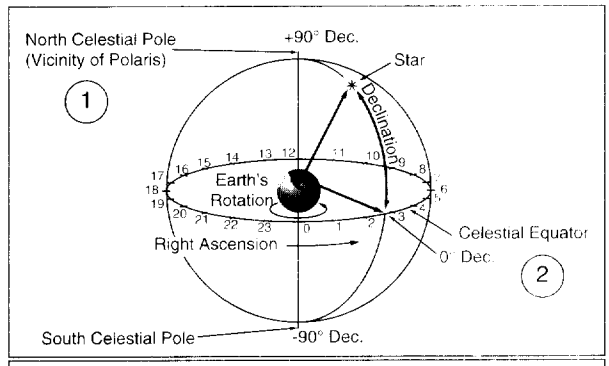


Fig. 16: Celestial Sphere.

Just as on the surface of the Earth, in mapping the celestial sphere, imaginary lines have been drawn to form a coordinate grid. Thus, object positions on the Earth's surface are specified by their latitude and longitude. For example, you could locate Los Angeles, California, by its latitude (+34°) and longitude (118°); similarly, you could locate the constellation Ursa Major (which includes the Big Dipper) by its general position on the celestial sphere:

R.A.: 11hr; Dec: +50°.

- **Right Ascension:** The celestial analog to Earth longitude is called "Right Ascension," or "R.A.," and is measured in time on the 24 hour "clock" and shown in hours ("hr"), minutes ("min") and seconds ("sec") from an arbitrarily defined "zero" line of Right Ascension passing through the constellation Pegasus. Right Ascension coordinates range from 0hr 0min 0sec to 23hr 59min 59sec. Thus there are 24 primary lines of R.A., located at 15 degree intervals along the celestial equator. Objects located further and further east of the prime Right Ascension grid line (0hr 0min 0sec) carry increasing R.A. coordinates.
- **Declination:** The celestial analog to Earth latitude is called Declination, or "Dec," and is measured in degrees, minutes and seconds (*e.g.*, 15° 27' 33"). Declination shown as north of the celestial equator is indicated with a "+" sign in front of the measurement (*e.g.*, the Declination of the North Celestial Pole is +90°), with Declination south of the celestial equator indicated with a "–" sign (*e.g.*, the Declination of the South Celestial Pole is –90°). Any point on the celestial equator itself (which, for example, passes through the constellations Orion, Virgo and Aquarius) is specified as having a Declination of zero, shown as 0° 0' 0".

All celestial objects are specified in position by their celestial coordinates of Right Ascension and Declination.

Polar Alignment

By polar aligning the telescope, two important telescope capabilities are enabled: (a) the motor drive permits the telescope to track any astronomical object, automatically; (b) the telescope's Dec and R.A. setting circles, discussed above, may be used to locate faint celestial objects directly from their catalogued coordinates.

Celestial objects are essentially fixed on the celestial sphere; however, they appear to move across the sky in an arc as the Earth rotates on its axis, with a complete rotation of the Earth occurring once in every 24 hour period. This apparent motion is not obvious to the unaided eye, but viewed through a telescope such as a LX50 model, this motion is rapid indeed. Objects centered in the telescope move entirely out of the field of view in 15 to 60 seconds, depending upon the magnification employed.

During the 24 hour period of the Earth's rotation, stars make one complete revolution about the Celestial Pole, making concentric circles with the Celestial Pole at the center. By lining up the telescope's polar axis with the North Celestial Pole (or South Celestial Pole if you are observing from the Earth's Southern Hemisphere), celestial objects may be followed (tracked) by moving the telescope about one axis, the polar axis.

The following polar alignment procedure assumes that the telescope has been set up on the Equatorial Wedge and LX50 Field Tripod, as shown in Fig. 1.

Polar alignment consists of the following two operations:

1. Setting the telescope's latitude angle, as read on the wedge's latitude scale so that the latitude scale reads the latitude of your observing location. Use the center of the lock knob or buttonhead socket screw as an indicator to read latitude angle.

CAUTION: Since the full weight of the telescope is resting on the tilt plate of the equatorial wedge, DO NOT loosen the knobs (3), Fig. 6, or screws (3), Fig. 7, without FIRMLY holding the telescope by its fork arms with one hand while loosening the screws on each side of the wedge, with the other hand. Alternately, enlist the assistance of a second person for this purpose.

Look up the latitude of your observing location. (Most road maps show lines of latitude.) Then, keeping the precautionary note above in mind, loosen the knobs or screws on each side of the wedge, and move the telescope in latitude angle until the hex-head screw reads the latitude of your observing location.

2. Situate the telescope and tripod so that the Control Panel is facing North.

   Locating due-north by using Polaris, the North Star, is adequate for the purposes discussed here. Polaris can be found in relation to the Big Dipper by projecting a line from the so-called "pointer stars" of the Big Dipper (Fig. 17).

   To rotate the telescope-and-wedge, loosen slightly the manual knob (8, Fig. 9); the telescope-and-wedge may then be rotated on top of the field tripod head.

   Rotate the telescope-and-wedge until the telescope's Control Panel faces due-north; then re-tighten the manual knob (8, Fig. 9).

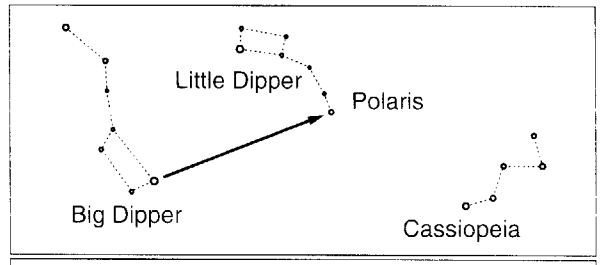


Fig. 17: Locating Polaris.

With the above steps accomplished the telescope is sufficiently well polar aligned for all visual observing purposes, as well as for photography of the Moon and planets. Long-exposure astrophotography requires more precise polar alignment, a subject discussed in the section **Precise Polar Alignment**, below.

With the level of pointing accuracy obtained by the above procedure the telescope's motor drive will accurately track and keep objects in the telescope's field of view for perhaps 20 to 30 minutes.

Once the latitude angle of the equatorial wedge has been set, there is no need to realign the latitude angle of the equatorial wedge unless the telescope is moved to a new observing site that is a considerable distance in latitude from the original observing site; 70 miles of movement north or south is equivalent to only one degree in latitude change. Removing the equatorial wedge from the tripod will not affect the latitude setting.

After polar aligning the telescope for the first time, take a moment to check the calibration of the Declination setting circles (1, Fig. 1). This is accomplished by following these steps:

1. Center Polaris in the telescope's field of view.
2. Slightly loosen the central hub of each of the Declination setting circles. (One circle is on each fork arm.)
3. Turn each setting circle until the dial reads 89.2° — the Declination of Polaris; then re-tighten the central hubs of each circle without moving the circle. The Declination setting circles are now calibrated.

Precise Polar Alignment

Precise polar alignment is essential for long-exposure astrophotography (typically defined as photo-exposures of 10 minutes or longer). Fewer tracking corrections are required during the duration of the exposure when the telescope is precisely polar aligned.

Precise polar alignment requires the use of a crosshair eyepiece — such as the Meade Illuminated Reticle Eyepiece — and a 2x Barlow lens for increased magnification (see **OPTIONAL ACCESSORIES**, page 15).

The method for precise polar alignment — commonly referred

to as the "drift" method — is as follows:

1. Obtain a rough polar alignment as described above. Once approximate alignment has been accomplished, insert the 2x Barlow lens and the illuminated reticle eyepiece into the telescope's eyepiece holder.
2. With the motor drive running, point the telescope at a moderately bright star near where the meridian (the north-south line passing through your local zenith) and the celestial equator intersect. For best results, the star should be located within +/–30 minutes in R.A. of the meridian and within +/–5° in Dec of the celestial equator. Pointing the telescope at a star that is straight up, and then moving the telescope in Dec to read 0° Dec, will point the telescope to the correct position.
3. Disregarding the drift in R.A., note the star's drift in Declination:
   a. If the star drifts South (or down), the telescope's polar axis is pointing too far East (Fig. 18).
   b. If the star drifts North (or up), the telescope's polar axis is pointing too far West (Fig. 19).

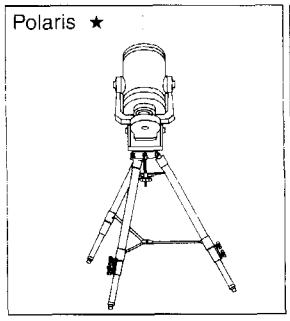


Fig. 18: Mount too far East.

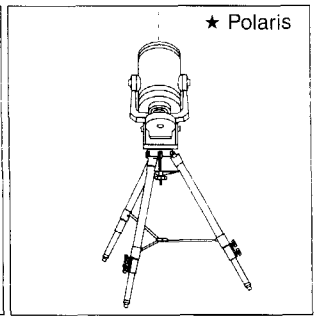


Fig. 19: Mount too far West.

4. Move the wedge in azimuth (horizontally) to change the polar alignment. Reposition the east-west polar axis orientation until there is no further north-south drift by the star. Track the star for a period of time to be certain that its Declination drift has ceased.
5. Next, point the telescope at another moderately bright star near the Eastern horizon, but still near the celestial equator. For best results, the star should be about 20° or 30° above the Eastern horizon and within +/–5° of the celestial equator (*i.e.*, still at about 0° Dec).
6. Once again, note the star's drift in Declination:
   a. If the star drifts South (or down), the telescope's polar axis is pointing too low (Fig. 20).
   b. If the star drifts North (or up), the telescope's polar axis is pointing too high (Fig. 21).
7. Use the fine latitude adjustment on the equatorial wedge to change the latitude angle based on your observations above. Again, track the star for a period of time to verify that Declination drift has ceased.

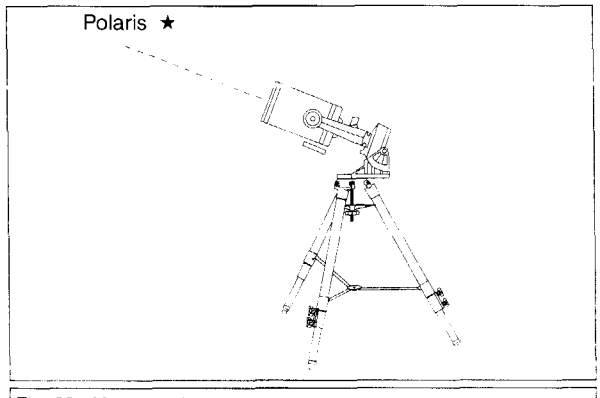


Fig. 20: Mount too low.

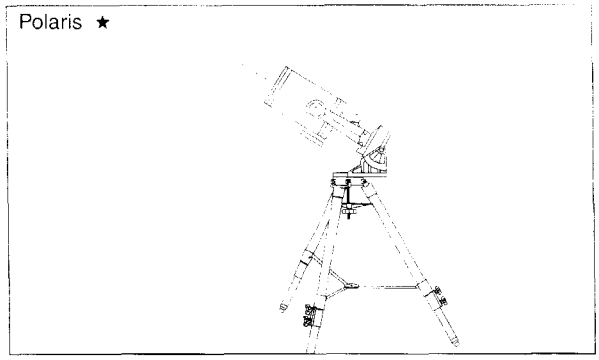


Fig. 21: Mount too high.

After completing these procedures your telescope is precisely polar aligned, minimizing the need for tracking corrections during long-exposure astrophotography.

How to Locate Objects in the Night Sky

Now that the telescope is fully assembled and polar aligned, you are ready to begin observations.

Note that although the above assembly and polar alignment procedures may seem quite tedious — particularly if the LX50 is your first serious telescope — in fact, assembly and approximate polar alignment (accurate enough for visual observing) will quickly become routine. Once set, the latitude angle of the equatorial wedge need never be changed, unless you move your observing site a considerable distance in latitude, perhaps 150 miles or more.

For the beginning amateur astronomer, the simplest method of locating objects in the night sky — and an excellent way to learn how to operate your telescope — is to look at a celestial object that can be clearly seen with your own eyes.

Find the desired object in the viewfinder, center the object in the viewfinder's crosshairs, then observe through the main telescope's eyepiece and adjust the focus knob until the image is clear and sharp. With the motor drive turned on, observe how the telescope tracks, or follows, the object as it arcs across the sky. Turn the motor drive off for a few seconds, and note how rapidly the objects move through the field of view.

The position of celestial objects changes over the course of the year, so it is good idea to obtain a star chart — such as the Meade Star Charts, available from your Meade dealer — or refer to the monthly star charts presented in astronomy magazines, such as *Sky & Telescope* and *Astronomy*.

With these aids and with a little experience at the controls of the LX50, you will soon be exploring the surface of the Moon, the planets of our Solar System and the incredible assortment of star clusters, galaxies, and nebulae that lie beyond.

The Motor Drive

The LX50 telescope models are driven by a DC electronic motor control system, powered by six AA-size batteries located inside the telescopes' drive base. (Recall that these batteries were installed per the instructions on page 8 of this manual.)

To use the motor drive, follow this procedure:

1. With the telescope polar aligned as described above, turn the motor drive on, using the switch (2), Fig. 13, located on the Control Panel.
2. After switching the motor drive on, allow a few seconds for the drive to take up any internal gear-backlash.
3. Now, as the telescope is moved from object to object, the motor drive will automatically track, or follow, the object, fully compensating for the effects of the Earth's rotation.

When each new object is centered in the telescope's field, the R.A. lock and Dec lock should be locked; the motor drive takes hold within a few seconds after the R.A. Lock is locked.

Setting Circles

Setting circles included with the LX50 models permit the location of faint celestial objects not easily found by direct visual observation. The R.A. circle (8), Fig. 1, is located on the top surface of the telescope's drive base. Declination circles (1), Fig. 1, are located at the top of each fork arm. With the telescope pointed at the North Celestial Pole, the Dec circle should read 90° (understood to mean +90°). Objects located below the 0-0 line of the Dec circle carry minus Declination coordinates. Each division of the Dec circle represents a 1° increment. The R.A. circle runs from 0^{hr} to (but not including) 24^{hr}, and reads in increments of 5^{min}.

NOTE: The R.A. circle is double-indexed (i.e., there are two series of numbers running in opposite directions around the circumference of the R.A. circle). The outer series of numbers (increasing counterclockwise) applies to observers located in the Earth's Northern Hemisphere; the inner series of numbers (increasing clockwise) applies to observers located in the Earth's Southern Hemisphere.

To use the setting circles to locate an object not easily found by direct visual observation:

With the telescope aligned to the pole, center an object of known R.A. in the telescopic field. Then turn the R.A. circle, which can be rotated manually, until the R.A. coordinate of the object is correctly indicated by the R.A. pointer. As long as the telescope's motor drive remains "ON," the R.A. pointer will then correctly indicate the R.A. of any object at which the telescope is pointed throughout the duration of the observing session.

To locate a particular object, first look up the celestial coordinates (R.A. and Dec) of the object in a star atlas. Then loosen the R.A. lock and turn the telescope to read the correct R.A. of the desired object; lock the R.A. lock onto the object. Next, turn the telescope in Declination to read the correct Declination of the object. If the procedure has been followed carefully, and if the telescope was well-aligned with the pole, the desired object should now be in the telescopic field of a low-power eyepiece.

If the desired object is not visible in the eyepiece, use the viewfinder to search the adjacent sky area, using the R.A. and Dec. slow-motion controls to scan the surrounding region. Because of its much wider field, the viewfinder may be of significant assistance in locating and centering objects, after the setting circles have been used to locate the approximate position of the object.

Pinpoint application of the setting circles requires that the telescope be precisely aligned with the pole. Refer to the preceding section on "Precise Polar Alignment" for further details

The setting circles may also be utilized in the absence of a power source for the motor drive. In this case, however, it is necessary to manually reset to the R.A. of the object you are observing just before going to the next object.

Observing Tips

To enjoy your telescope to the fullest, follow these recommendations:

1. Let the telescope "cool down" to the outside temperature before attempting to make serious observations. After removing the telescope from a warm house, the telescope's optics need about 15 to 20 minutes to adjust to the outside temperature before they will perform well.
2. Avoid setting up the telescope inside a room and observing through an open window (or, worse, a closed window!). In such a case air currents caused by differences in indoor/outdoor temperatures make quality astronomical optical performance impossible.

Note: A practical exception to the above rule is the case where the LX50 models are, for example, set up in a living room or den for observing an outdoor terrestrial scene or view through a closed window. At low powers (up to about 60X) a telescope will perform reasonably well in this application, but the observer should understand clearly that optical performance under these conditions can not approach the performance that will be realized if the telescope were instead set up outside.

3. As discussed above, avoid "overpowering" your telescope. If the terrestrial or astronomical image becomes fuzzy at high powers, drop down to a lower power. Image degradation at high powers is not due to any fault of the telescope but is caused by heat waves and turbulence in the earth's atmosphere. Astronomical observations at high powers (*i.e.*, above about 200X) should be undertaken only when the atmosphere is very steady, as confirmed by an absence of "twinkling" in star images.
4. Try not to touch the eyepiece when observing through the telescope. Vibrations in your hand are immediately transferred to the telescopic image.
5. If you wear eyeglasses and do not suffer from astigmatism, take your glasses off when using the telescope; the telescope's magnification compensates for near- or farsightedness. Observers with astigmatism should, however, wear their glasses, since the telescope can not compensate for this eye defect.
6. Allow your eyes to become "dark adapted" before attempting serious astronomical observations through the telescope. Night adaptation normally requires about 10 to 15 minutes.
7. As you use your telescope more and more for astronomical observing, you will find that you are seeing finer and finer detail — on the surface of Jupiter, for example. Observing through a fine optical instrument is to some degree an acquired skill. Celestial observing becomes increasingly rewarding as your eye becomes better trained in the detection of subtle variations of color, contrast, and resolution.

Astrophotography

As discussed earlier, LX50 telescopes are well suited for the astrophotographer, facilitating both long-exposure guided photography or CCD imaging with its stable fork mounting, DC electronic worm-gear drive system, and hand controller.

Through-the-telescope photography is possible using any 35mm camera body with a removable lens. In this way, the telescope effectively becomes the lens of the camera. To adapt a camera body to a LX50 model, an optional #62 T-Adapter

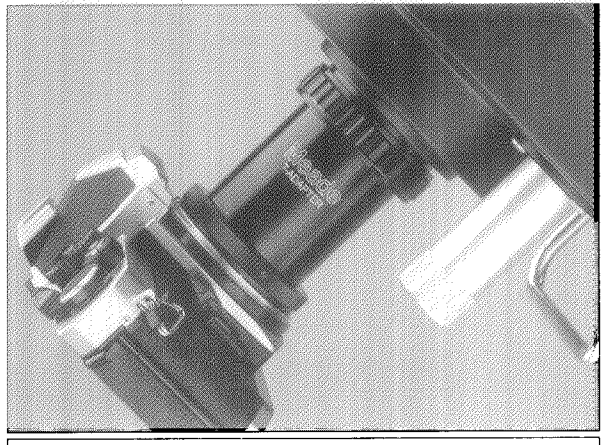


Fig. 22: 35mm camera mounted to telescope with T-Adapter.

(Fig. 22) is required as well as a T-Mount for the particular brand of 35mm camera being used. The #62 T-Adapter screws into the LX50 eyepiece holder. The camera body with the T-Mount attached, then slips into the T-Adapter.

Long-exposure, deep-space astrophotography of more than about 5 or 10 minutes' duration requires two telescope capabilities: (a) a means of monitoring the precise position of the object being photographed throughout the exposure, and (b) a means of changing the telescope's position very slightly to keep the object in exactly the same position throughout the exposure.

The Meade Off-Axis Guider and Illuminated Reticle Eyepiece, optional accessories fully described in the Meade General Catalog, fulfill the first requirement above. The standard-equipment hand controller satisfies the second requirement by providing the ability to perform precise dual axes corrections in all directions (N-S-E-W).

A few tips for basic astrophotography:

1. The telescope must be precisely polar aligned (see **Precise Polar Alignment**, page 12).
2. The tripod must be on a solid surface and the base of the equatorial wedge must be level.
3. Use a cable-operated shutter release. Touching the camera body to initiate shutter operations will almost certainly introduce undesirable vibrations.
4. Focus the image with extreme care. While observing the celestial object through the camera's viewfinder, turn the telescope's focus knob to achieve the sharpest possible focus, then open the camera's shutter to begin your exposure.
5. Correct shutter speeds vary widely, depending on lighting conditions and the film used. Trial-and-error is the best way to determine the proper shutter speed in any given application.
6. Astrophotography is an acquired skill; exercise patience and expect to waste a few rolls of film as you learn the techniques. The rewards of taking a quality astrophotograph, however, will make all your efforts worthwhile.
7. Terrestrial photography through the telescope is sensitive to heat waves rising from the Earth's surface. Long distance photography is best accomplished in the early morning hours, before the Earth has had time to build up heat.

TERRESTRIAL OBSERVING

Although principally designed for astronomical observing, the LX50 model of telescope makes an excellent terrestrial observing tool. The telescope's controls are utilized in the same manner as for astronomical applications, but there are several significant differences in how you will locate and observe terrestrial subjects.

Image Orientation

The viewfinder presents an inverted image; what you see appears upside-down and reversed left-for-right.

With the standard-equipment diagonal prism and 25mm eyepiece in place in the main telescope, terrestrial images will appear right-side-up, but reversed left-for-right. This orientation is usually acceptable for terrestrial observing, except in the case of reading a distant sign or automobile license plate, for example.

Terrestrial image orientation can be fully corrected with the optional Meade #928 45° Erect-Image Diagonal Prism (see Optional Accessories, opposite).

OPTIONAL ACCESSORIES

A wide assortment of professional Meade accessories is available for the LX50 model telescope. The premium quality of these accessories is well-suited to the quality of the instrument itself. The following accessories are interchangeable between the 7", 8" and 10" LX50 models.

Eyepieces

Meade Super Plössl (SP), Super Wide Angle (SWA), and Ultra Wide Angle (UWA) Eyepieces in the standard American-size (1.25") barrel diameter permit a range of magnifying powers with the telescope. Powers obtained with each eyepiece are as follows:

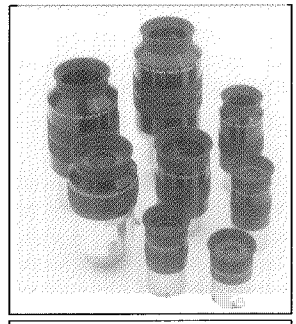


Fig. 20: Series 4000 eyepieces.

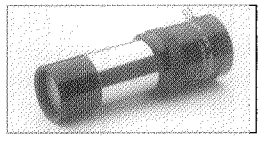
Eyepiece	Magnifying Power 7" f/15	8" f/10	10" f/10
SP 6.4mm	417X *	313X	391X *
SP 9.7mm	275X	206X	258X
SP 12.4mm	215X	161X	202X
SP 15mm	178X	133X	167X
SP 20mm	134X	100X	125X
SP 26mm	103X	77X	96X
SP 32mm	83X	63X	78X
SP 40mm	67X	50X	63X
SWA 13.8mm	193X	145X	181X
SWA 18mm	148X	111X	139X
SWA 24.5mm	109X	82X	102X
UWA 4.7mm	568X *	426X *	532X *
UWA 6.7mm	398X *	299X	373X

* Use these eyepieces only under extremely steady atmospheric conditions.

Meade Super Plössl and Super Wide Angle Eyepieces are ideal for general-purpose astronomical or terrestrial observing. The typical LX50 user may wish to add 2 or 3 of these eyepieces to his or her telescope. An introductory selection might include the SP 9.7mm and SP 15mm. The more advanced observer will perhaps select the SP 9.7mm, SP 12.4mm, and SWA 18mm. The Super Wide Angle Eyepiece series yields extremely wide fields of view, perfect for the examination of star fields, diffuse nebulae, or for terrestrial applications. Under very steady seeing conditions Meade UWA 4.7mm and 6.7mm eyepieces present the widest fields of view obtainable at high powers and are excellent eyepieces for the Moon and planets.

#140 2x Barlow Lens

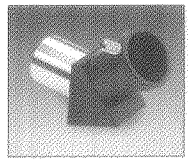
An amplifying lens, the #140 2x Barlow doubles the power of all eyepieces with which it is used. Insert the diagonal prism into the telescope's eyepiece holder first, followed by the #140 Barlow lens, and eyepiece.



Example: For the 8" f/10 model, the standard equipment 25mm eyepiece yields a power of 80X; when used in conjunction with the #140 2x Barlow Lens, this eyepiece yields 160X.

#928 45° Erect-Image Diagonal Prism

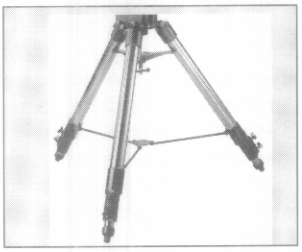
Primarily used for terrestrial viewing, this prism presents a correctly-oriented image at a comfortable 45° viewing angle.



Illuminated Reticle Eyepieces

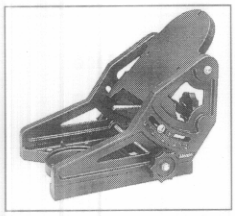
Meade Illuminated Reticle Eyepieces are used for precise polar alignment of your telescope and, during long-exposure astrophotography, in conjunction with the optional Meade Off-Axis Guider, for through-the-telescope monitoring of the object being photographed while the camera's shutter is open. Two optical designs are available: Series 4000 Plössl 9mm or Modified Achromatic 12mm.

LX50 Standard Field Tripod



The variable-height Standard Field Tripod permits an extremely rigid observing platform for the telescope, even at high magnifications. For field use the tripod collapses for easy transport.

Superwedge (10" model only)

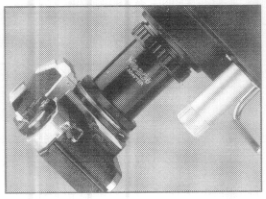


The Superwedge is an optional equatorial wedge designed for the LX50 10" telescope. Includes a compass for easy polar aligning, and the ability to adjust both the Latitude and Azimuth of the wedge with one control knob each.

Magellan II Telescope Computer System

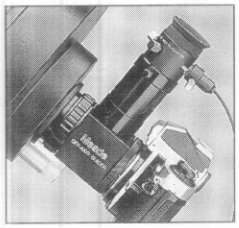
Attached to a Meade LX50 telescope, the Magellan II Telescope Computer permits the quick (10 to 15 second) location of any object in the sky from its catalogued coordinates, or call up any of more than 12,000 sky objects in Magellan's database. Specify Model #2024 Magellan II for all LX50 models.

#62 T-Adapter



With the #62 T-Adapter attached to the telescope, through-the-telescope photography is possible with any 35mm camera body with a removable lens. Thread the T-Adapter on to the rear cell of your telescope, followed by a T-Mount for the particular brand of 35mm camera being used, and the camera body is thereby rigidly coupled to the telescope.

Off-Axis Guider



The Off-Axis Guider provides a means during long-exposure astrophotography for the photographer to monitor the tracking of the telescope, to assure that the telescope remains precisely positioned on the object being photographed. Like the T-Adapter, the Off-Axis Guider couples the camera body to the telescope but it also causes a small amount of the guidestar's incoming light to be diverted at a right angle, where the star's position can be examined for tracking errors with an illuminated reticle eyepiece; position corrections can then be effected using the hand controller.

#541 AC Adapter

The optional #541 AC Adapter permits powering of the telescope via a standard household (115v.AC) electrical outlet. Requires #607 Power Cord.

#607 Power Cord

Powering the LX50 telescope by means of an automobile cigarette lighter plug requires the #607 Power Cord. With this 25 ft. cord the LX50 may be powered for a full night's observing without risk of car-battery drain.

MAINTENANCE AND SERVICING

The LX50 is a precision optical instrument designed to yield a lifetime of rewarding applications. Given the care and respect due any precision instrument, the LX50 will rarely, if ever, require factory servicing. Maintenance guidelines include:

1. Avoid cleaning the telescope's optics: a little dust on the front surface of the telescope's correcting lens causes virtually no degradation of image quality and should not be considered reason to clean the lens.
2. When absolutely necessary, dust on the front lens should be removed with very gentle strokes of a camel's hair brush or blown off with an ear syringe (available at any pharmacy).
3. Organic materials (*e.g.*, fingerprints) on the front lens may be removed with a mixture of 1 part pure isopropyl alcohol, 2 parts distilled water, and 1 drop of biodegradable liquid dishwashing soap per pint of solution, using soft, white facial tissues. Make short, gentle strokes and change the tissues often.
4. Do not, for any reason, remove the correcting plate from its machined housing for cleaning or other purposes. You will almost certainly not be able to replace the corrector in its proper rotational orientation and serious degradation of optical performance will result. Meade Instruments assumes no liability for damage incurred to the telescope in this way.
5. If the LX50 is used outdoors on a humid night, water condensation on the telescope surfaces will probably result. While such condensation does not normally cause any damage to the telescope, it is recommended that the entire telescope be wiped down with a dry cloth before the telescope is packed away. Do not, however, wipe any of the optical surfaces. Rather, simply allow the telescope to sit for some time in the warm indoor air, so that the wet optical surfaces can dry unattended.
6. If the LX50 is not to be used for an extended period, perhaps for one month or more, it is advisable to remove the batteries from inside the control panel (p. 8). Batteries left in the Control Panel for prolonged periods may leak, causing damage to the telescope's electronic circuitry.
7. Do not leave the LX50 inside a sealed car on a warm summer day; excessive ambient temperatures can damage the telescope's internal lubrication and electronic circuitry.
8. A set of four hex wrenches is provided with the LX50 in the following sizes: 1/16", 5/64", 3/32", and 5/32".

Collimation of the Optical System

The collimation (alignment) of any astronomical telescope used for serious purposes is important, but in the case of the Schmidt-Cassegrain design of the 8" and 10" LX50 models, such collimation is absolutely essential for good performance. Take special care to read and understand this section well so that your telescope will provide the best optical performance.

As part of final optical testing, every Meade Schmidt-Cassegrain is precisely collimated at the Meade factory before shipment; however, vibrations in shipping can cause the optical system to become misaligned. Re-aligning the optics is, however, a straightforward process.

Note: The design of the 7" LX50 Maksutov-Cassegrain telescope allows collimation to be permanently "set" at the factory. Therefore, a collimation procedure is not necessary for this telescope.

To check the collimation of the 8" and 10" LX50 models, center a bright star that is overhead, or use a "hot spot" of reflected sunlight from a chrome car bumper, with the supplied 25mm eyepiece. Allow the telescope to adjust to the temperature of

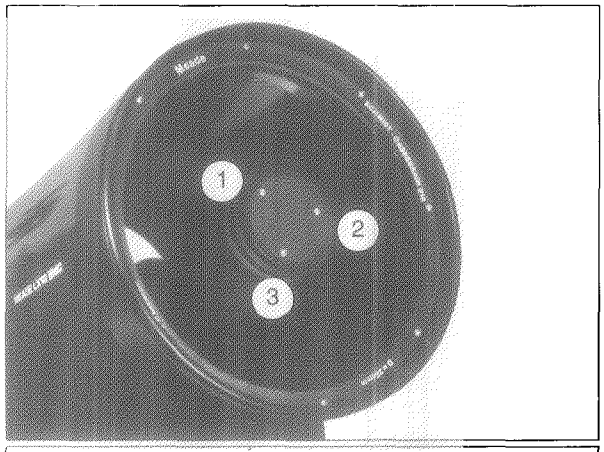


Fig. 23: (1), (2), (3) set screws for adjusting collimation.

your observation site before proceeding; temperature differences between the optics and the outside air can cause distortion in the images.

With the star or hot spot centered, de-focus the image. You will notice that the out of focus star image looks like a ring of light surrounding a dark central spot; the dark central spot is in fact the shadow of the secondary mirror. Turn the focus knob until the ring of light fills about 10% of the eyepiece field-diameter. If the dark central spot is offset in (*i.e.,* not concentric with) the ring of light, your telescope's optical system is misaligned and requires collimation.

Follow these steps for collimation of the optical system:

1. The only adjustments possible, or necessary, on the 8" and 10" LX50 models are from the three set screws (Fig. 23) located at the edge of the outer surface of the secondary mirror housing.

   Caution: Do not force the three collimation screws past their normal travel and do not loosen them more than two full turns in a counterclockwise direction or the secondary mirror may come loose from its support. You will find that the adjustments are very sensitive, usually requiring only one-half turn or less to produce the desired result.

2. While looking at the defocused star image, notice which direction the darker shadow is offset in the ring of light or notice which part of the ring is the thinnest (1, Fig. 24). Place your index finger in front of the telescope so that it touches one of the collimation set screws. You will see the shadow of your finger in the ring of light. Move your finger around the edge of the black plastic secondary mirror support until you see the shadow of the finger crossing the thinnest part of the ring of light. At this point, look at the front of the telescope where your finger is aiming. It will either be pointing directly at a set screw, or it will be between two set screws aiming at the set screw on the far side of the black plastic secondary mirror support. This is the set screw that you will adjust.

3. Using the slow-motion controls, move the defocused image to the edge of the eyepiece field of view (2, Fig. 24) in the same direction as the darker shadow is offset in the ring of light.

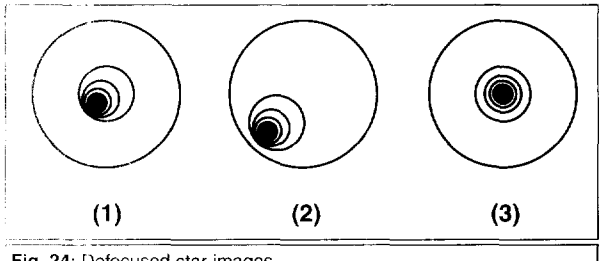


Fig. 24: Defocused star images.

4. Turn the set screw that you found with the pointing exercise while looking in the eyepiece. You will notice that the star image will move across the field. If while turning the defocused star image flies out of the eyepiece field, then you are turning the screw the wrong way. Turn the opposite direction and bring the image back to the center of the field.

5. If the screw you are turning becomes very loose, tighten the other two screws by even amounts. If the screw gets too tight, unthread the other two by even amounts.

6. When you bring the image to center (3, Fig. 24) carefully examine the evenness of the ring of light (concentricity). If you find that the dark center is still off in the same direction, continue to make the adjustment in the original turning direction. If it is now off in the opposite direction, you have turned too far and you need to turn in the opposite direction. Always double check the image in the center of the field of the eyepiece.

7. You may find after your initial adjustment that the dark center is off in a new direction (*e.g.,* instead of being off side-to-side it is now off in an up-and-down direction). In this case repeat steps 2 through 6 to find the new adjustment screw.

8. Now try a higher power eyepiece (*e.g.,* 9mm or less) and repeat the above tests. Any lack of collimation at this point will require only very slight adjustments of the three set screws.

9. As a final check on alignment, examine the star image in focus with the higher power eyepiece as suggested above, under good viewing conditions. The star point should appear as a small central dot (commonly referred to as an "Airy disc") with a diffraction ring surrounding it. To give a final precision collimation, make extremely slight adjustments of the three set screws, if necessary, to center the Airy disc in the diffraction ring. With the Airy disc centered, the best alignment of the telescope's optics has been achieved.

Inspecting the Optics

A Note about the "Flashlight" Test: If a flashlight or other high-intensity light source is pointed down the main telescope tube, the view (depending upon the observer's line of sight and the angle of the light) may reveal what appears to be scratches, dark or bright spots, or just generally uneven coatings, giving the appearance of poor quality optics. These effects are only seen when a high intensity light is transmitted through lenses or reflected off the mirrors, and can be seen on any high quality optical system, including giant research telescopes.

The optical quality of a telescope cannot be judged by the "flashlight" test; the true test of optical quality can only be conducted through careful star testing.

Adjusting the Right Ascension Lock

After a period of time, the R.A. lock (11, Fig. 1) may not tighten sufficiently due to internal wear of the clutch mechanism. In such an event remove the R.A. lock lever using one of the supplied hex wrenches. Then, using a standard pair of pliers, tighten the shaft protruding outward from the drive base until you cannot easily rotate the fork arm in R.A., taking care not to scratch the finish of the telescope mounting. Replace the R.A. lock lever so that its handle points straight out from the crossbar connecting the fork arm.

Adjusting the Declination Lock

Continual use of the Declination lock (16, Fig. 1) may cause this lock to loosen. To retighten the lock, first turn the manual Declination slow-motion knob (12, Fig. 1) so that the Declination tangent arm (located inside the left-hand fork mount arm) is about in the middle of its travel. Put the

Declination lock lever in the "unlocked" position (toward the eyepiece), and insert a 1/8" hex wrench into the notched-out section of the left-hand fork arm. Tighten the hex-head nut located just inside the notch.

CAUTION: In most instances only one turn of this hex-head nut is required to fully retighten the Declination lock.

Slow Blow Fuse

Located behind the Control Panel is a 1 amp slow blow fuse that will sacrifice itself to protect the LX50 electronics in the event of a current overload. Access the fuse by removing the four Phillips head screws on the front of the Control Panel.

Gauging Telescope Movement

A common complaint of many first-time telescope owners is that they cannot see the telescope "move" when the motor drive is engaged. If fact, when the batteries are installed, the power is on and the R.A. lock engaged, the telescope is moving. However, the movement is at the same speed as the hour hand of a 24-hour clock; as such, the movement is difficult to discern visually.

To check the movement of a telescope, look at an astronomical object through the telescope's eyepiece with the telescope polar aligned and with the motor drive on. If the object remains stationary in the field of view, the telescope is operating properly. If not, check to ensure that the R.A. lock is engaged and that the power switch on the control panel is on. If the telescope is still not tracking, replace the batteries.

Storage and Transport

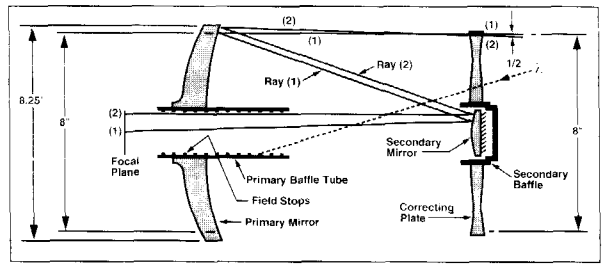
When not in use, store the telescope in a cool, dry place. Do not expose the instrument to excessive heat or moisture. In addition when the telescope is to be stored for more than one month, remove the 6 AA-size batteries from the Control Panel; battery leakage may damage the electronic system.

When transporting the telescope, take care not to bump or drop the instrument; this type of abuse can cause the optical system to misalign or cause damage to the electronic components.

Meade Customer Service

If you have a question concerning your Meade LX50 model telescope, call Meade Instruments/Customer Service Dept. at 949-451-1450, or fax at 949-451-1460. Customer Service hours are 8:30AM - 4:00PM, Pacific Time, Monday through Friday. In the unlikely event that your LX50 telescope requires factory servicing or repairs, write or call the Meade Customer Service Dept. first, before returning the telescope to the factory, giving full particulars as to the nature of the problem, as well as your name, address, and daytime telephone number. The great majority of servicing issues can be resolved by telephone, avoiding return of the telescope to the factory.

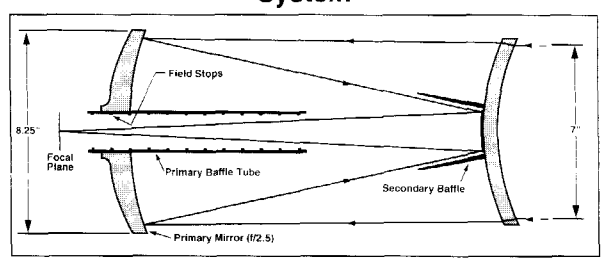
The Meade Schmidt-Cassegrain Optical System



In the Schmidt-Cassegrain design of the Meade LX50, light enters from the right, passes through a thin lens with 2-sided aspheric correction ("correcting plate"), proceeds to a spherical primary mirror, and then to a convex secondary mirror. The convex secondary mirror multiplies the effective focal length of the primary mirror and results in a focus at the focal plane, with light passing through a central perforation in the primary mirror.

The Meade LX50 includes oversize primary mirrors, with the primary mirror of this 8" telescope at 8.25" diameter, yielding fully illuminated fields-of-view significantly wider than is possible with standard-size primary mirrors. Note that light ray (2) in the figure would be lost entirely, except for the oversize primary. It is this phenomenon which results in Meade Schmidt-Cassegrains having off-axis field illuminations about 10% greater, aperture-for-aperture, than other Schmidt-Cassegrains utilizing standard-size primary mirrors. Field stops machined into the inside-diameter surface of the primary mirror baffle tube significantly increase lunar, planetary, and deep-space image contrast. These field stops effectively block off-axis stray light rays,λ.

The Meade Maksutov-Cassegrain Optical System



The Meade 7" Maksutov-Cassegrain design optimizes imaging performance by utilizing a combination of two-sided spherical meniscus lens *(right)*, a strongly *aspheric* f/2.5 primary mirror, and a spherical secondary mirror. The convex secondary mirror multiplies the effective focal length of the primary by a factor of six, resulting in an overall f/15 system at the Cassegrain focus.

The oversize 8.25" primary mirror results in a fully-illuminated (unvignetted) field of view significantly wider than can be obtained with Maksutov optics incorporating primary mirrors of the same aperture as their meniscus correcting lenses. Computer-optimized primary and secondary mirror baffles, as well as a sequence of field stops internal to the primary mirror baffle, yield lunar, planetary, stellar, and deep-space images of uncommonly high contrast and resolution.

Specifications and Features: Meade 7", 8" and 10" LX50 Telescopes

Telescope	7" LX50 f/15	8" LX50 f/10	10" LX50 f/10
Optical Design	Maksutov-Cassegrain Catadioptric	Schmidt-Cassegrain Catadioptric	Schmidt-Cassegrain Catadioptric
Clear Aperture	178mm (7")	203mm (8")	254mm (10")
Primary Mirror Diameter	194mm (7.625")	209.6mm (8.25)	263.5mm (10.375)
Focal Length	2670mm (105")	2000mm (80")	2500mm (100")
Focal Ratio	f/15	f/10	f/10
Resolution	.64 arc sec	.56 arc sec	.45 arc sec
Super Multi-Coatings	Standard	Standard	Standard
Limiting Visual Magnitude (approx)	13.5	14.0	14.5
Limiting Photographic Magnitude (approx)	16	16.5	17.0\
Image Scale (°/inch)	.55°/inch	0.72°/inch	0.57°/inch
Maximum Practical Visual Power	450X	500X	625X
Near Focus	50'	25'	50'
Optical Tube Size	9.1" Dia. x 19" Long	9.1" Dia. x 16" Long	11.75" Dia. x 22" Long
Secondary Mirror Obstruction	2.5" (12.8%)	3.0" (14.1%)	3.7" (13.7%)
Telescope Mounting	Heavy-Duty Fork-Type Double Tine	Heavy-Duty Fork-Type Double Tine	Heavy-Duty Fork-Type Double Tine
Setting Circle Diameters	Dec.: 6"; R.A.: 8.75"	Dec.: 6"; R.A.: 8.75"	Dec.: 6"; R.A.: 8.75"
RA Motor Drive System	4-speed, microprocessor controlled 12v. DC servo motor; 5.75" worm gear	4-speed, microprocessor controlled 12v. DC servo motor; 5.75" worm gear	4-speed, microprocessor controlled 12v. DC servo motor; 5.75" worm gear
Hemispheres of Operation	North and South - switchable	North and South - switchable	North and South - switchable
Declination Control System	4-speed, DC servo controlled with tangent arm system	4-speed, DC servo controlled with tangent arm system	4-speed, DC servo controlled with tangent arm system
Motor Drive Gear Diameter	5-3/4" Worm Gear	5-3/4" Worm Gear	5-3/4" Worm Gear
Manual Slow-Motion Controls	Dec. and R.A.	Dec. and R.A.	Dec. and R.A.
Hand Controller	PIC16C54 microcontroller	PIC16C54 microcontroller	PIC16C54 microcontroller
Main Controller	PIC16C57 microcontroller	PIC16C57 microcontroller	PIC16C57 microcontroller
Telescope Size, Swung Down	9.25" x 16" x 32.5"	9.25" x 16" x 25"	12" x 19" x 31"
35mm Angular Film Coverage	0.74° x 0.52°	0.97° x 0.68°	0.78° x 0.54°
35mm Linear Film Coverage @:			
50'	4.7" x 6.6"	6.2" x 8.7"	5.0" x 7.0"
500'	4.6' x 6.5'	6.0' x 8.5'	4.8' x 6.8'
3000'	27.4' x 38.9'	36.0' x 51.0'	28.8' x 40.8'
Tele-Extender Used Without Eyepiece @:			
50'	4.4" x 6.5"	6.8" x 8.5"	4.6" x 6.8"
500'	4.2' x 5.5'	4.9' x 7.2'	4.0' x 5.8'
3000'	24' x 34'	31' x 45'	25' x 36'
Net Telescope Weights (approx)			
Telescope	45#	35#	59#
Equatorial Wedge	7#	7#	9#
Super Wedge	N/A	N/A	26#
Field Tripod *(optional)*	20#	20#	20#
Accessories	8#	8#	8#
Shipping Weights (approx)			
Telescope	65#	55#	80#
Equatorial Wedge	9#	9#	11#
Superwedge	N/A	N/A	38#
Field Tripod *(optional)*	26#	26#	26#
Accessories	5#	5#	5#

MEADE LIMITED WARRANTY

Every Meade telescope, spotting scope, and telescope accessory is warranted by Meade Instruments Corporation ("Meade") to be free of defects in materials and workmanship for a period of ONE YEAR from the date of original purchase in the U.S.A. and Canada. Meade will repair or replace a product, or part thereof, found by Meade to be defective, provided the defective part is returned to Meade, freight-prepaid, with proof of purchase. This warranty applies to the original purchaser only and is non-transferable. Meade products purchased outside North America are not included in this warranty, but are covered under separate warranties issued by Meade international distributors.

RGA Number Required: Prior to the return of any product or part, a Return Goods Authorization (RGA) number must be obtained from Meade by writing, or by calling (949) 451-1450. Each returned part or product must include a written statement detailing the nature of the claimed defect, as well as the owner's name, address, and phone number.

This warranty is not valid in cases where the product has been abused or mishandled, where unauthorized repairs have been attempted or performed, or where depreciation of the product is due to normal wear-and-tear. Meade specifically disclaims special, indirect, or consequential damages or lost profit which may result from a breach of this warranty. Any implied warranties which can not be disclaimed are hereby limited to a term of one year from the date of original retail purchase.

This warranty gives you specific rights. You may have other rights which vary from state to state.

Meade reserves the right to change product specifications or to discontinue products without notice.

This warranty supersedes all previous Meade product warranties.

Meade Instruments Corporation
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Part Number 14-0203-50